Chapter 1

INTRODUCTION

1. INTRODUCTION

1.1 Sector Development in the Philippines

The Government of the Philippines (GOP) has, over the last decade, with the assistance from external donors, made considerable progress in developing the water supply and sanitation sector. Development has covered physical and institutional framework nationwide.

Nevertheless, infrastructure service delivery including this sector during the period 1987 to 1997 has been insufficient to keep pace with the demand, which was magnified by natural calamities and economic status of the country.

About 68% (46.7 M) of the population nationwide enjoyed access to potable water supply in 1995 (66% in 1992). In urban areas outside Manila, 61% (11.6 M) had access to safe water supply services (47% in 1992), while in the rural areas, 70% (26.1 M) was covered by point water sources (80% in 1992). However, from the surveys conducted through the PW4SP, it was found out that about 20-30% of the existing water sources in the rural areas fall on the category of underserved or unserved in terms of safe or unsafe sources, damaged and non-functioning sources. Hence, of the rural population, it was estimated that only about 50-55% was served adequately by safe sources. This implies that around 60% of the total population enjoy water supply services at present.

Private sanitary toilets were available to 66% (45.3 M) of the total household nationwide in 1996 based on the DOH compiled reports. Communal toilet facilities are generally found only at schools, public markets and sometimes in bus terminals and town parks. For sewerage, only portions of the cities of Metro Manila, Cebu and Baguio have sewerage systems. Municipal refuse collection using service trucks is limited to urban areas. In 1996, majority of the households (55%) practiced individual disposal, mostly dumping, while the remaining 45% relied on municipal refuse collection and disposal services.

The policies and strategies on the sector are generally guided by the "Updated Medium-Term Philippine Development Plan (MTPDP: 1996-1998) in 1996" and the recently published "Philippine National Development Plan (PNDP: 1999-2025)". Activities in the sector have been directly guided by the "Water Supply, Sewerage and Sanitation Master Plan of the Philippines 1988-2000" since its issuance in 1988. The National Sector Master Plan (NSMP) sets ambitious targets to reach large segments of the population and to redress the imbalances between rural and urban areas. Meanwhile, the Updated MTPDP revised the targets for water

supply services based on updated conditions in 1996. The PNDP further modified the targets this year to suit current sector status.

Development in the sector had previously been directed to a high degree by central government agencies. However, the GOP has been instituting devolution and full decentralization of responsibilities for implementation of infrastructure projects to Local Government Units (LGUs), in line with the Local Government Code of 1991. Major initiatives towards this direction in the sector are the current projects being implemented such as the World Bank-assisted Local Government Unit-Urban Water Supply and Sanitation Project and the ADB-funded Rural Water Supply and Sanitation Project. Both projects aim at building/enhancing local level capacity in planning, implementation and management of water and sanitation services.

The GOP has also recently approved the Implementing Rules and Regulations (IRR) of Clause (g) of NEDA Board Resolution No. 4 (series 1994) providing detailed arrangements in accordance with broad reforms aimed at streamlining sectoral activities. The institutional framework therefore, presented in this provincial sector plan considers the direction of the central government agencies and LGUs in the sector.

1.2 Provincial Sector Planning

1.2.1 Objectives of Sector Planning

The main objectives of the provincial sector plan are:

(1) To formulate a Long-Term Provincial Development Plan with a target year of 2010 for the water supply, sewerage and sanitation sector;

(2) To propose a Medium-Term Sector Investment Plan covering the years 2001-2005 to form the basis for implementing foreign and locally funded projects;

(3) To recommend arrangements and logistics for implementation; and

(4) To provide measures to strengthen operational framework and institutional capabilities including community development and gender responsiveness.

1.2.2 Scope of Sector Planning

The study covers the following major elements to achieve the objectives mentioned above.

(1) Collection and Review of Previous Studies and Existing Data, and Establishment of Data Base: Inventories on existing conditions and facilities

1) Natural conditions and geographical features
2) Socio-economic conditions
3) Population
4) Health status
5) Environmental conditions
6) Existing facilities and service coverage
   - Water Supply
   - Sanitation and Sewerage
7) Existing sector arrangements and institutional capacity
   - Sector institution
   - Current community development, gender and training approaches
   - Existing sector monitoring systems
8) Past financial performance in the sector development

(2) Long-Term Development Plan
1) Projection and assumption of planning framework: projection of population and relevant frame values, and targets of the sector plan
2) Service coverage by target year
   - Water Supply
   - Sanitation and Sewerage
3) Water source development
4) Service expansion plan
5) Estimation of project cost
6) Investment program

(3) Medium-Term Investment Plan (5-year)
1) Facilities and equipment, and rehabilitation required meeting target services
2) Identification of priority projects
3) Sector management plan
   - Institutional arrangements
   - Community development, gender and training
   - Procurement, construction and operation and maintenance
   - Sector coordination
4) Estimation of project cost
5) Financial arrangements
   - Sources of fund
   - Additional funding requirements

- Investment needs ranking of municipalities
- Implementation arrangements
- Cost recovery

(4) Monitoring for Evaluation of Provincial Plan Implementation

1.2.3 Financing of Sector Plan

The First Water Supply, Sewerage and Sanitation Sector Project (FW4SP) was implemented with financial assistance from the World Bank (IBRD). With reference to the Project, the technical assistance to help Provincial Governments prepare 37 provincial sector plans in Luzon area was financed by various bilateral and multilateral agencies, such as the United Nations Development Program (UNDP), the Danish International Development Agency (DANIDA) and the Japan International Cooperation Agency (JICA).

In September 1996, the GOP requested the Government of Japan to finance the preparation of the Study for 21 provinces in Visayas and Mindanao areas. Among these was Antique province, which was assisted by the JICA. The PW4SP will be the basis to permit execution of the sector development from the proceeds of the sector loan by foreign donors, LGUs budget including internal revenue allotment from National Government and private sector investment.

1.3 The Provincial Plan for the Province of Antique

1.3.1 Preparation of the Plan

The PW4SP for the Province was prepared by a Provincial Sector Planning Team (PSPT) organized by the provincial government. The members consist of the Provincial Planning and Development Coordinator (PPDC), the planning and development officers from PPDO, and the staff members from Provincial Engineers Office (PEO), Provincial Health Office (PHO) and Provincial Local Government Operations Office (PLGOO-DILG). The preparation of the plan was assisted by the Department of the Interior and Local Government (DILG), the Department of Public Works and Highways (DPWH), the Department of Health (DOH), the Local Water Utilities Administration (LWUA), the National Economic and Development Authority (NEDA), other national line agencies and non-government organizations (NGOs) active in the sector. The PSPT was also assisted by the JICA Study Team through technical grant assistance from the Japanese Government (refer to Minutes of Discussions between

DILG and JICA, and Figure 1.3.1 Organization Chart, 1.3.1 Preparation of the Plan, Supporting Report).

The PW4SP has been prepared at municipal level covering all sub-sectors for each municipality of the Province.

The report consists of three (3) volumes: I - Main Report, II - Supporting Report, III - Data Report.

1.3.2 Outline of the Report

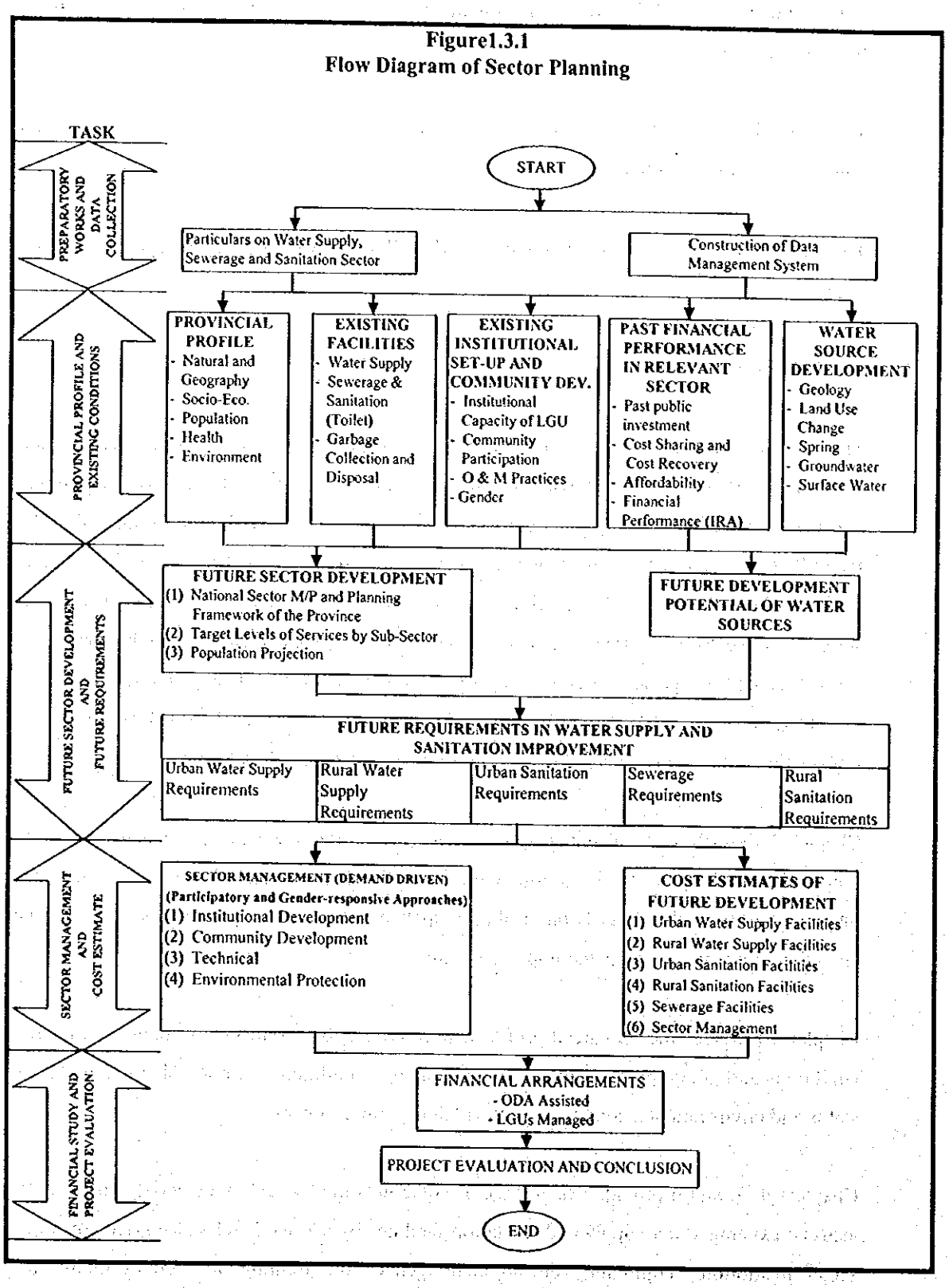
The PW4SP is a framework plan that would serve as the basis for the future implementation work in the sector. It will be carried out either as large-scale projects funded by international agencies or as a small size project carried out by local parties. It should be noted that the PW4SP is a sector development plan for the entire province and that it does not include detailed planning of individual projects. The individual projects will commonly cover selected sub-sector/s for limited areas and detailed planning/design work has to be conducted for the respective projects before start of construction work. The planning process is presented in Figure 1.3.1. The following are the contents of the Main Report (List of data and information collected is included in 1.3.2 Outline of the Report, Data Report).

Chapter 2 describes the planning approach for the sector development, which guides the preparation of the plan: the background and rationale for provincial planning; as well as the planning tool that relies heavily on local participation and gender responsiveness, and flexible enough to improve planning and implementation.

Chapter 3 provides the provincial profile with reference to current sector conditions: natural conditions and geographical features, socio-economic conditions, demographic trends, health status and environmental conditions as the planning environment.

Chapters 4, 5, and 6 provide existing sector conditions in physical, managerial and financial aspects: existing water supply and sanitation facilities by service level and service coverage; sector institutions, community development, gender and training, as well as monitoring systems; and financial performances entailing cost recovery and affordability and new fiscal policies that are the basis and references to come up with future development plan.

Figure1.3.1
Flow Diagram of Sector Planning



Chapter 7 analyzes the possibility of water source development for the water supply component: geological and hydrological conditions in the province, and future development potential of different water sources. Furthermore, water source availability by concerned municipality was presented with well specifications for the medium-term development.

Chapters 8, 9 and 10 develop the long-term Development Plan and the medium-term Investment Plan both for physical and sector management requirements. Emphasis is placed on the sector management for the medium-term development plan entailing institutional arrangements and operational framework, community development, gender and training and project implementation needs. Required costs for physical and institutional elements are also presented according to the implementation arrangements.

Chapter 11 presents the financial arrangements based on identified sources of funds. The financial shortfall is shown to meet provincial targets established for the Medium-Term Investment Plan. The manner of national budget allocation (IRA) to municipalities by sub-sector is illustrated and trial calculation is made for the target year considering the new cost sharing policy between the central government, the LGUs and the beneficiaries. Investment need ranking of municipalities as a factor of financial allotment is also considered based on synthetic evaluation of sector components. The financial viability study of Level I water supply and sanitation projects is highlighted with reference to ODA assisted projects for eligible municipalities. Finally, cost recovery by the beneficiaries and the LGUs is discussed.

Chapter 12 provides recommendations on monitoring of implemented projects covering procedures and responsibilities in different administrative levels. Periodic monitoring will allow for the updating of the PW4SP and modification of respective projects both in quality and quantity.

1.4 Acknowledgment

The Provincial Sector Planning Team (PSPT) which was responsible in the preparation of the PW4SP, acknowledges the extended cooperation, support and assistance of the Department of the Interior and Local Government (DILG), and other national, regional, provincial, municipal, city, and barangay institutions. These institutions had shared essential data and planning principles (List of individuals and their corresponding offices who directly participated in the preparation of the plan is included in 1.4 Acknowledgment, Data Report). The Japanese Government through JICA has generously provided technical assistance to the PSPT throughout the course of the planning work.

Chapter 2

PLANNING APPROACH FOR FUTURE SECTOR DEVELOPMENT

2. PLANNING APPROACH FOR FUTURE SECTOR DEVELOPMENT

2.1 General

The primary basis of the PW4SP is summarized with reference to the national sector policy and strategies as well as the major legislation and regulations relevant to the sector. Planning framework is also discussed with reference to key measurable targets. Guiding principles for preparation of the plan are described in application of computer-aided planning approach.

2.2 Planning Framework

The GOP, through the Water Supply, Sewerage and Sanitation Master Plan of the Philippines: 1988-2000, the Philippine National Development Plan: 1999-2025, and the Updated Medium Term Philippine Development Plan (MTPDP): 1996-1998, has manifested its commitment to the development of safe and dependable water supply and sanitation facilities. Policies and investment programs are compiled in these documents which lay out the basis of a strategy to accelerate sector development through the equitable mobilization of resources between urban and rural areas and institutional reforms at all government levels. Guiding principles set in the aforementioned national development plans are sustained decentralization; private sector-led development; environmental protection; people participation; full cost recovery; social equity; accelerated information technology applications and macro-economic stability.

According to the Updated MTPDP targets for the year 1998, the population served with potable water shall be increased up to 76.4% (52.4 M). This corresponds to 81.6% (9.9M) of the Metro Manila population, 68.8% (16.3 M) in other urban areas, and 79% (29.5 M) in the rural areas. Sewerage facilities in Metro Manila and other highly urbanized areas will be constructed. About 1.8 million toilets will be built nationwide.

Given these updated MTPDP targets, as well as the goals set in the 1988 NSMP, the current indications and the planning cycle adopted for this provincial sector planning, the national targets as shown in Table 2.2.1 will be used as the basis for setting the provincial targets.

Table 2.2.1 National Sector Coverage Targets

Sub-Sector	Year 1995	Year 2003 [1]	Year 2010 [2]
Urban Water Supply [3]	61%	69%	95%
Rural Water Supply	70% [4]	79%	93%
Sanitation	60% [5]	68%	93%

Notes:
[1] Based on the Updated MTPDP targets for 1998.
[2] Based on the long-term targets set in the previous National Sector Master Plan (NSMP).
[3] Excluding Metro Manila and its outlying areas.
[4] Includes only point sources.
[5] Service coverage for 1996.

2.3 Sector Objectives

The objectives of the sector are:

(1) To provide safe and adequate water supply and sanitation to meet basic needs;

(2) To pursue proper O & M of facilities for sustainable water supply;

(3) To undertake the phased construction and installation of sewerage facilities; and

(4) To develop the capabilities of LGUs to implement water supply, sewerage and sanitation programs with the national government providing assistance in the areas of community participation, sub-sector planning, program management, regulation of development, selection of technologies, financial management, construction supervision, monitoring and reporting.

2.4 Current Sector Policies and Strategies

(1) One clear policy shift has been towards the **promotion of self-reliance** and **local community management** of services. Since the seventies, formation of local water districts in provincial urban areas has been aggressively pursued. During the eighties, this shift was further induced with the establishment of community-run BWSAs and RWSAs to provide services in smaller rural and peri-urban areas. Recently, more comprehensive **demand-driven** participatory approach and **gender sensitive** participation initiatives are given impetus to ensure success and sustainability of the sector's projects especially in rather small rural and urban fringe areas.

(2) An **integrated approach to water, sanitation and hygiene education** has been prescribed in order to achieve full health benefits of improved services. The GOP promotes intensified health education and information programs to improve hygiene practices at the household level.

(3) **Cost sharing arrangement** is enforced. In line with devolving the central government's functions and responsibilities, particularly those that have social and/or environmental objectives, projects/activities are implemented through a cost sharing arrangement between the central government agency and LGUs. As for the sector, national (central) government's (NG's) grant is to be extended only to Level I systems for eligible municipalities, and its share is within a range of 0 to 50% of the total capital cost. The remaining are managed by LGUs, communities, or BWSAs/RWSAs. No subsidies from the central government are to be provided for Levels II and III systems. For public toilets in public markets, the share of the NG is within 50 to 70%.

(4) **Cost recovery of capital and O & M costs** of all water supply service levels by beneficiaries is to be encouraged. This is a distinct switch from subsidies, which characterized previous strategies. Current priorities also stress the need to promote the collection of such costs, especially in Levels I and II.

(5) **Private sector participation** is encouraged to bring into the sector business principles and practices and private capital to accelerate social and economic development; to improve sector efficiencies; and to ease the burden on the GOP's budget and foreign borrowing. Public-private partnership is to be pursued through any of these mechanisms: build-operate-transfer, concession arrangements, privatization of WDs, LGU-private sector MOA, LGU-WDs collaboration and others.

(6) **An integrated water resources strategy** has been adopted in areas combining irrigation, power, flood control, and domestic and industrial water supply. Small and medium-scale water resources projects through the active participation of the people are encouraged. **Watershed management**; water conservation and erosion and sediment control are deemed critical.

2.5 Major Legislation and Regulations Affecting the Sector

(1) The **Local Government Code of 1991** (RA 7160) provides for a more responsive and accountable local government structure. Local government units now exercise more authority and responsibilities and provide resources to accelerate the provision of basic services and facilities, including water supply, sanitation and sewerage. The **Implementing Rules and Regulations (IRR)** to effect the devolution of water and sanitation responsibilities and resources was recently approved. The IRR integrates the common

definition of terms for water supply and sanitation and defines the roles and functions of central government agencies and LGUs for the sector (details are referred to 5.2, Data Report).

(2) The **Water Code of the Philippines** (PD 1067) consolidates legislation relating to the ownership, development, utilization, exploitation and conservation of water resources. The Code established the basic principles and framework on the appropriation, control and conservation of water resources to achieve their optimum economic efficiency and rational development. In addition, PD 424 declares that the National Water Resources Board (NWRB) shall be responsible for coordinating and integrating all activities related to water resources. PD 1067 also pertains to the grant of water right privileges (water permits) to appropriate and use water. Water permit applications are reviewed and granted by the NWRB.

(3) The **Provincial Water Utilities Act of 1973** (PD 198) authorizes the formation of local water districts in the provincial areas outside the Metropolitan Manila area, and provides for their administration and operation. It also created the Local Water Utilities Administration (LWUA) as a specialized lending institution for the promotion, development and financing of local water districts.

(4) The **Metropolitan Waterworks and Sewerage System (MWSS) Charter** (RA 6234) was enacted in 1971. The utility was formed to take over the facilities of NAWASA in 1971. The Charter was amended by virtue of PD 1046 expanding further its territorial jurisdiction to include areas that may be included in the growing metropolis.

(5) The **Philippine Environmental Policy** (PD 1151) requires all public and private entities to undertake an environmental impact assessment of all projects, which significantly affect the quality of the environment. The **Philippine Environmental Code** (PD 1152) established standards for air and water quality, and guidelines for land use management, natural resource management and conservation, utilization of surface and groundwater, and waste management.

(6) The **Sanitation Code (1975)** was promulgated to deal with water supply, excreta disposal, sewerage and drainage issues. The Sanitation Code and the **National Building Code (1977)** require that new buildings be connected to a water-borne sewerage system. Where such systems do not exist, sewage must be disposed of onto Imhoff tanks or septic

tanks with a subsurface absorption field. In addition, the facilities are required to conform to the **1959 National Plumbing Code.**

(7) The **1981 Rules and Regulations for Domestic Wastewater Disposal** require all subdivisions and condominiums, etc. to have adequate sewage collection, conveyance, treatment and disposal facilities. A permit must be obtained prior to commissioning a new system.

2.6 Planning Principles and Data Management

2.6.1 Planning Principles

The PW4SP shall be prepared to ensure that the sector investments are optimized under the constraints of funds and water source availability as well as planning capability. Furthermore, the plan shall ensure its sustainability at the provincial level. The overviews of the plan will be progressively adjusted and refined at different detailed implementation stages. Accordingly, the demarcation is a prerequisite between a sector plan and succeeding detailed plan/s. Specifically, the following are required as planning principles.

(1) The plan is conceived to be flexible, consistent and as simple as possible to respond to the changing socio-economic conditions of the province, accumulated technical information and updated policy of local governments allowing for periodic upgrading.

(2) The plan is arranged to allow planners to run different scenarios for project implementation, especially with reference to the interface between the provincial plan and project proposals from municipalities (bottom-up).

(3) The plan is conceived to be adaptable to the local planning capacity and to ensure its full "ownership" by LGUs.

In addition, the following shall be taken into account to help the provincial planners perform their tasks.

(1) The plan follows existing provincial and municipal planning routines to minimize duplicated planning activities. It is essential to maintain and extend the involvement of local officials for data collection.

(2) The plan, as a comprehensive tool, considers the consistency to derive the next level of planning.

(3) The plan entails monitoring and evaluation of actual implementation progress, as investments are undertaken.

The guideline for preparation of the PW4SP is included in the Planning Approach for Future Sector Development, Data Report. It identifies all tables and figures with respective forms by main, supporting and data reports.

2.6.2 Data Management

The data management system was established to come up with the basic outputs commensurate to the objectives of the provincial plan and at the same time reflect the planning approach mentioned above. It will provide a map of relative needs in the province allowing for adjustment and updating when further information becomes available. Monitoring and evaluation are to be done using the tool, thereby serving as baseline information for the improvement of planning and implementation. Different scenarios maybe worked out by planners using the program in application of variable parameters.

The need for full and continuous involvement of local officials is indispensable to establish a reliable database.

(1) Computer-based system

Data management system is designed to perform simple and direct interfaces in data processing. Since a limited number of municipalities is the planning level entailing data collection from the administrative units, EXCEL was selected to facilitate data storage, retrieval, updating and processing.

The data storage system was arranged to parallel the structure of questionnaires and contain the same system of logical categories under institutional hierarchical system of the Philippines as shown in Figures 2.6.1 and 2.6.2. Data are encoded by hierarchical level.

A series of EXCEL routines was established to allow summaries and consolidation of data into the forms required for analysis and presentation. Details together with User's Guide for computer-aided planning are included in 2.6.2 Data Management, Supporting Report.

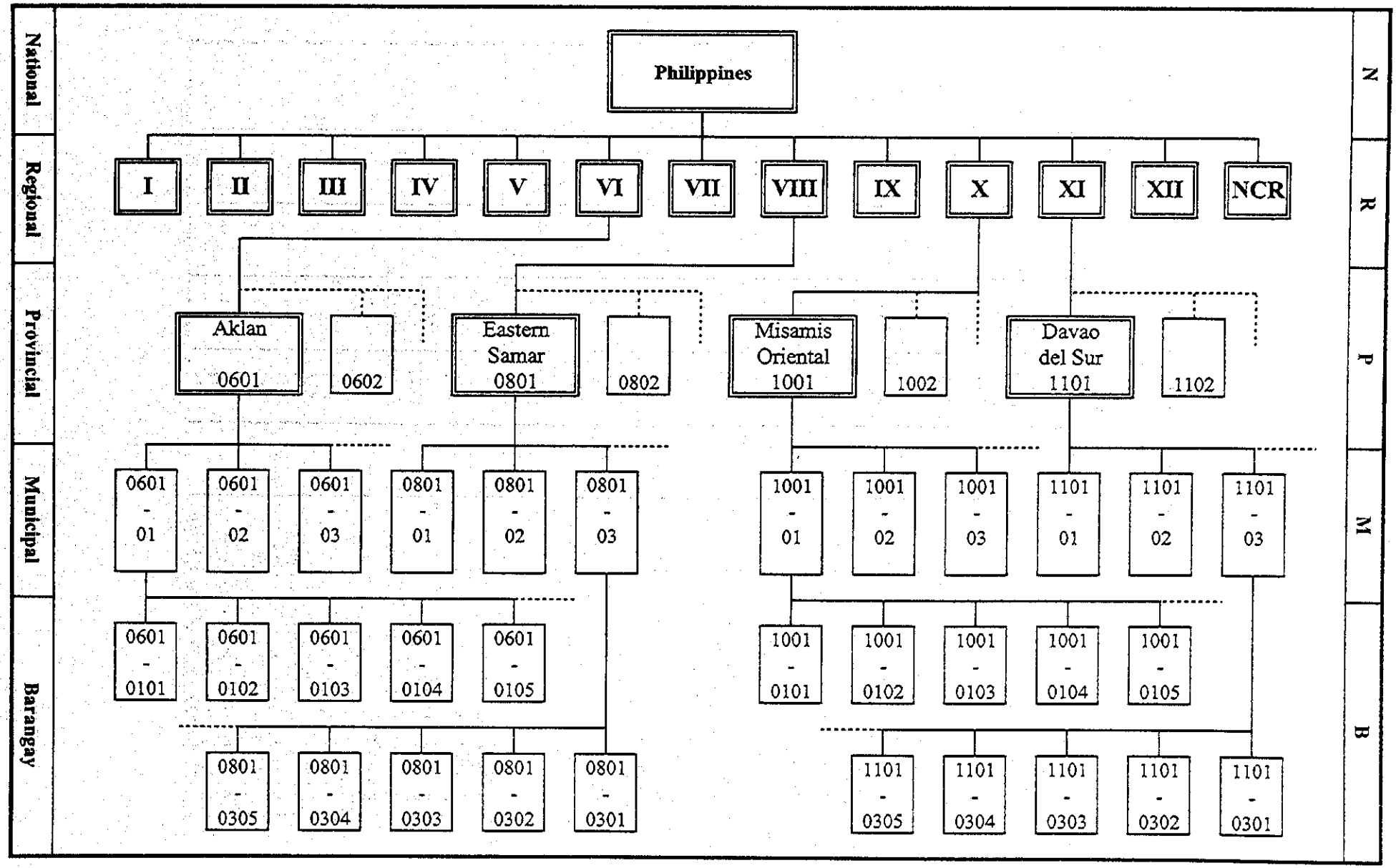


Figure 2.6.1 Institutional Hierarchical System by the NEDA Coding

Table 2.6.2 Structure of Questionnaire

Grouping of Questionnaire	Questionnaire to be addressed						
	National	Regional	Provincial	Municipal	Barangay	System	Independent
	N	R	P	M	B	S	I
1. Socio-economic Data							
1.1 Mun./City Status and no. of Brgy.			P.1.1				
1.2 Past Population			P.1.2	M.1.2			
1.3 Projected Population			P.1.3.1	M.1.3.1			
			P1.3.2	M.1.3.2			
1.4 Number of Households			P.1.4	M.1.4			
1.5 Services			P.1.5	M.1.5			
1.6 Occupation			P.1.6	M.1.6			
1.7 Family Income			P.1.7	M.1.7			
1.8 Family Expenditure Pattern			P.1.8	M.1.8			
1.9 Agricultural Annual Income			P.1.9	M.1.9			
1.10 Education and Literacy			P.1.10	M.1.10			
2. Land Use Data							
2.1 Existing Land Use			P.2.1				
2.2 Future Land Use			P.2.2				
3. Health Data							
3.1 Morbidity and Mortality			P.3.1	M.3.1			
3.2 Health Facility			P.3.2	M.3.2			
3.3 Medical Practitioner			P.3.3	M.3.3			
4. Water Sources Data							
4.1 Water Source General Information			P.4.1				
4.2 Water Source Technical Information			P.4.2				
4.3 Untapped Spring Information				M.4.3			
4.4 Well Information				M.4.4			
4.5 Surface Water Sample Point for Water Quality Analysis				M.4.5			
5. Water Supply Data							
5.1 Level I Facility			P.5.1	M.5.1			
5.2 Level II System						S.5.2.1	
						S.5.2.2	
5.3 Level III System						S.5.3.1	
						S.5.3.2	
						S.5.3.3	
						S.5.3.4	
6. Environmental Sanitation							
6.1 Household Toilet			P.6.1	M.6.1			
6.2 School and Student			P.6.2	M.6.2			
6.3 School Toilets			P.6.3	M.6.3			
6.4 Public Toilets (Public Market)			P.6.4.1	M.6.4.1			
Public Toilets (Jeepney/Bus Terminal)			P.6.4.2	M.6.4.2			
Public Toilets (Parks/Playground)			P.6.4.3	M.6.4.3			
6.5 Drainage Facilities			P.6.5	M.6.5			
6.6 Solid Waste Collection and Disposal			P.6.6	M.6.6			
7. Investment Data							
7.1 Income and Expenditure			P.7.1				
7.2 Past Internal Revenue Allotment to the Province			P.7.2				
7.3 Available Funds for Capital Expenditures (20% DF)			P.7.3				
7.4 Sector Previous Investment to the Province by Concerned Agencies			P.7.4				
7.5 Sector Allocation in the Annual Investment Plan			P.7.5				
7.6 Allocation of the 20% Development Fund			P.7.6				
7.7 Financial Indicators of Water District/Waterworks			P.7.7				
7.8 Loan Status of Water District			P.7.8				
7.9 Affordability in Water Supply and Sanitation Services			P.7.9				

(2) Key Parameters

Establishment of criteria and assumptions are requisites in the planning process. In this connection, key parameters are identified to allow for preparation of alternative plans and updating in accordance with sector improvement policy in the future. The parameters for relevant sub-sectors are assumed on an urban and rural basis for respective municipalities referring to current conditions and practices on national and provincial levels. The following are the selected parameters.

1) Number of households to be served by a Level I facility
2) Safe and unsafe percentages of Level I facilities
3) Standard number of students to be served by a unit of sanitary toilet
4) Standard number of toilets for a public utility
5) Provincial sector targets by sub-sector
6) Composition of different types of toilets
7) Per capita water consumption for Level III system
8) Composition of different types of well sources and their specifications
9) Percentage of Level I wells to be rehabilitated
10) Unit construction cost of different facilities per person/household/facility/system
11) Percentage of sector management cost to construction cost
12) Physical and price contingencies
13) Unit recurrent cost of different systems/facilities
14) Allocation factors/percentages of IRA
15) Share of public investment
16) Funding levels/percentages for different financing scenarios
17) Scoring factors for municipal investment ranking
18) Annual distribution of investment cost (medium-term development)

The above-mentioned parameters are not included in the database program, since they are to be established through sensitivity analysis. Assumed figures are directly entered into a separate spreadsheet that is linked to the output files.

(3) Data Processing

Collected data are entered into the forms constructed in EXCEL database. The data are consolidated into final forms in application of small programs prepared for this planning. Linked outputs in tables and graphics are prepared in EXCEL spreadsheets for final

analysis and presentation. Key parameters are entered in a key parameter table linked to the output tables (refer to 2.6.2 Data Management, Supporting Report).

Data in the questionnaire forms (database) are transferred to the output tables for final calculations. Adjustments are made through manipulation of the key parameter table.

Chapter 3

PROVINCIAL PROFILE

3. PROVINCIAL PROFILE

3.1 General

The province of Antique is one of the 6 provinces comprising Western Visayas Region (Region VI) with San Jose de Buenavista as its provincial capital. It is 96 road kms from Iloilo City, the regional center. Occupying the whole length of the western side of Panay island, Antique is bounded by Aklan on the north, the mountains of Central Panay on the east, Cuyo East Pass on the west, and Panay Gulf on the south as shown in the Location Map. The municipality of Caluya is made up of six islets off the northwestern coast of the province.

The province is classified as 3rd class and has a total land area of 2,522km^2 that is 0.84% of the Philippine total land area of about 300,000km^2. It is composed of 18 municipalities. Based on the 1995 NSO records, the province has 590 barangays, of which 72 are urban and 518 rural. Provincial total population was 431,713 in 1995. About 74% of the population reside in rural areas, while the remaining 26% in urban areas. At present, there are 6 water districts and 5 LGU/association managed Level III water supply systems operating in the province. Table 3.1.1 presents the breakdown per municipality of land area, population and density, as well as administrative composition.

Table 3.1.1 Outline of Municipalities

Municipality		Land Area (km^2)	1995 Population		Number of Barangay		
Name	Class		Number	Density (person/km^2)	Urban	Rural	Total
Anini-y	5th	55.20	18,657	338	1	22	23
Barbaza	5th	119.00	17,313	145	2	37	39
Belison	5th	37.50	11,174	298	1	10	11
Bugasong	4th	129.80	26,721	206	4	23	27
Caluya	4th	117.00	17,101	146	2	16	18
Culasi	4th	192.00	30,431	158	3	41	44
Hamtic	4th	139.60	36,167	259	5	42	47
Laua-an	5th	207.80	21,069	101	2	38	40
Libertad	5th	76.00	13,274	175	2	17	19
Pandan	5th	137.00	24,978	182	3	31	34
Patnongon	4th	126.10	29,235	232	1	35	36
San Jose de Buenavista (Capital)	3rd	25.60	42,927	1,677	28		28
San Remigio	4th	264.90	22,869	86	1	44	45
Sebaste	5th	96.90	12,438	128	6	4	10
Sibalom	3rd	246.70	46,143	187	5	71	76
Tibiao	5th	145.80	19,628	135	2	19	21
Tobias Fornier	5th	111.70	26,155	234	2	48	50
Valderrama	5th	293.40	15,433	53	2	20	22
Provincial Total	3rd	2,522.00	431,713	171	72	518	590

3.2 Natural Conditions and Geographical Features

3.2.1 Meteorology

The province has 2 types of climate under the Coronas classification: Type I, which is experienced in the southern part and Type III, in the northern part. Type I is characterized by two pronounced seasons, dry from December to May and wet from June to November, while Type III has no very pronounced maximum rain period, with a short dry season lasting only from one to three months as reflected in the Location Map. From the rainfall record of PAGASA, the average annual rainfall was registered at 3,643.63mm. Maximum rainfall was observed during the months of June to September and the minimum was in February to April.

The average annual temperature is 27°C with December and January being the coldest months. On the average, the province experiences one tropical typhoon in a year.

3.2.2 Land Use

With its mountainous terrain, the forest area constitutes 47% of the total area of the province located mostly in Mts. Nangtud, Madia-as, Llorente and Inaman mountain ranges. Grassland and agricultural land occupy 24% and 26%, respectively. Built-up area is limited to less than 2%. Primary settlements are concentrated along the coastal areas and major transport routes. The existing land use pattern as presented in Table 3.2.1 must be enhanced by rehabilitation of watersheds in order to pursue a sustainable growth of the province. The remaining forest cover must be conserved to serve as watershed rather than as source of timber. An efficiently managed watershed collects and regulates flow of water, controls soil erosion and minimizes water pollution. Conversion of the remaining forestland to other uses will restrict its function as a watershed. A significant increase in agricultural area will result in a high demand of water.

Table 3.2.1 Current Land Use

Land Use	Area (km^2)	Percentage over Total Land Area
Forest Land	1,186	47.04
Grassland/Openlands	612	24.28
Built-up	47	1.87
Agricultural	666	26.42
Fishponds, Mangrove, Inland Water Area	10	0.39
Provincial Total	2,522	100.00

3.2.3 Topography and Drainage

A high rugged range of mountains that runs parallel to its western coast dominates the topography of the province. The slopes are highest and steepest on the north where they reach a maximum elevation of 2,049 m at Mt. Nangtud. The entire coastal area consists of a series of small coastal lowlands with intervening rock-spurs that descend from the highlands. There is one island municipality of Caluya, which is composed of Caluya Islets. The most extensive plain in the province is located in the southern basin formed by Sibalom River.

The drainage pattern of the provincial river system is characterized by a dendritic pattern and most of the rivers are relatively short and steep. Among the major rivers are Sibalom, Cangaranan, Paliwan and Bacong Rivers, most of which discharge into the Cuyo East Pass at the western coast of the province.

Figure 3.2.1 shows the natural drainage systems of the province. Table 3.2.2 is a list of the main rivers and their corresponding drainage areas with recorded flow rates at the site of the gauging station.

Table 3.2.2 Drainage Areas & Flow Rates of Major Rivers

Major River	Drainage Area (km^2)	Flow Rate (m^3/sec)			Water District (using river water)
		Peak	Maximum	Minimum	
Bacong	54	142.6	57.3	0.1	None
Paliwan	176	1,143.2	916.9	0.4	None
Cangaranan	No gauging station in the watershed.				None
Sibalom	635	921.0	461.8	0.1	None

Source: Philippine Water Resources Summary Data, established January 1980 by NWRC
Notes: Peak - Peak discharge of Daily Maximum Discharge
Maximum - Maximum Daily Discharge of Weighted Daily Discharge
Minimum - Minimum Daily Discharge of Weighted Daily Discharge

Water quality analyses at selected rivers were not conducted during this study. According to the classification obtained from the Regional DENR, water quality at each river meets the Class A or B limitation of "DENR Fresh Water Quality Criteria". It is noted that the river water quality in southern part of the province is slightly turbid after heavy rain compared with northern rivers. Generally, river water in northern area has crystal color.

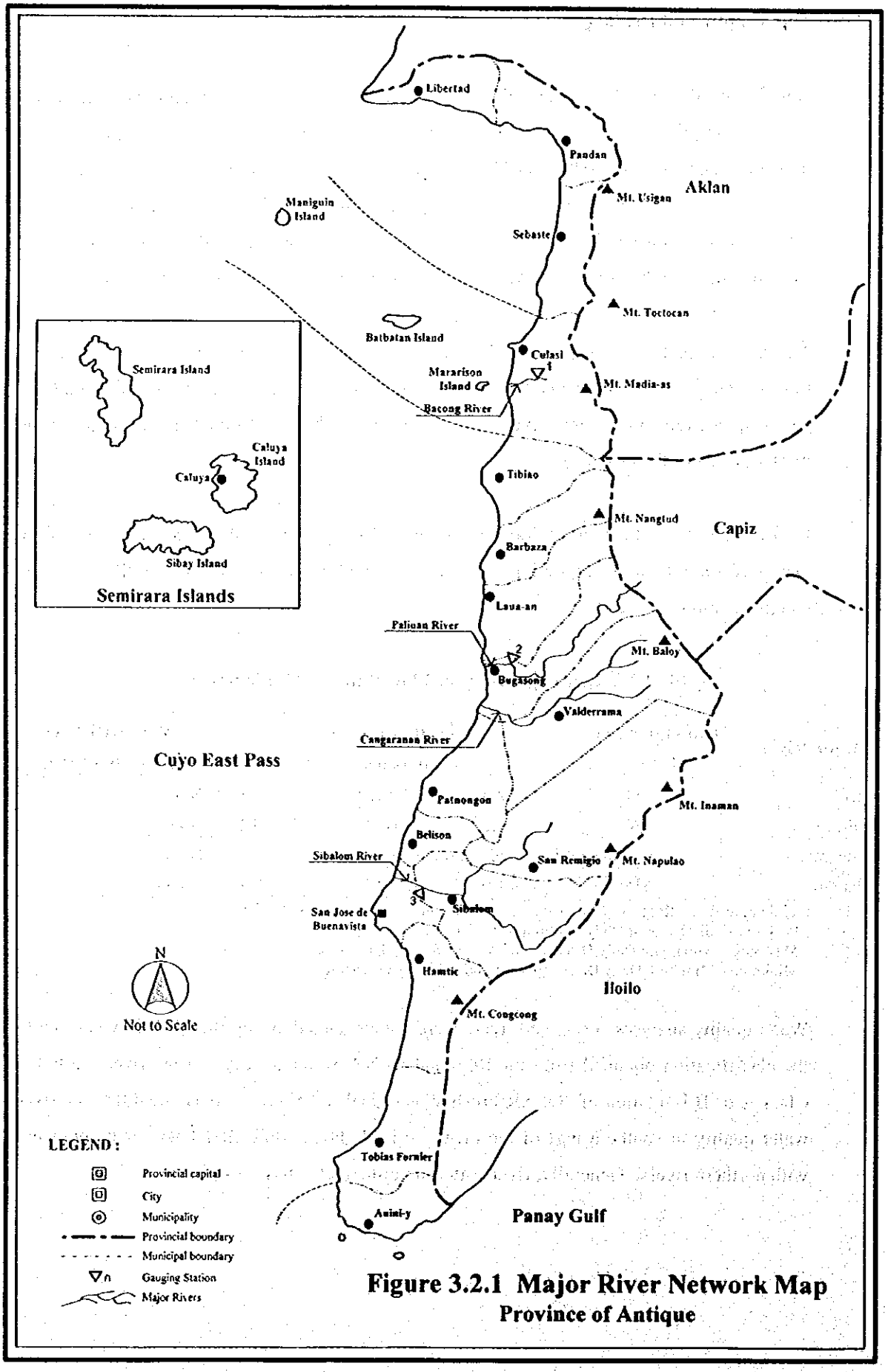


Figure 3.2.1 Major River Network Map
Province of Antique

3.3 Socio-economic Conditions

3.3.1 Economic Activities and Household Income

Antique is basically an agricultural province with rice and sugarcane as the principal crops. The major economic activities are farming and fishing. Marine and other aquatic resources are the other important commodities because of its relatively long coastline and the presence of several productive fishing grounds, especially along the Cuyo East Pass. At present, the province is promoting cottage industry and tourism as another income-generating activities.

The NSO Family Income and Expenditures Survey in 1994 showed that the average annual family income of the province was ₱ 42,393 while the expenditure was at ₱ 42,706 or a net dis-saving of ₱ 313. Distribution of families by income class in the region and province is shown in Figure 3.3.1 (refer to Table 3.3.1, Supporting Report). Percentages of families of lower income levels were higher than the average figures in the region. Based on the established poverty threshold income of ₱ 47,133, in Region VI for 1994, about 64% of the total number of families lived within and below the poverty threshold.

As to the number of workers by major industry group, agriculture, fishery and forestry had the dominant share followed by social and personal services (refer to Table 3.3.2, Supporting Report). By class of worker, those who were self-employed without any paid employee had the highest share of 38% as shown in Figure 3.3.2.

3.3.2 Basic Infrastructure

All municipalities have electric supply with service coverage at household level at 60%. Only 33% of the municipalities have telecommunication services. There are 18 post offices in the province. Land transportation is available by means of jeepney, bus, vans and tricycle. There are only 33 business establishments and 22 tourism facilities. Table 3.3.1 presents a provincial outline of public services and Table 3.3.2 reflects the number of public facilities and services by municipality (refer to Table 3.3.1, Data Report).

3.3.3 Education

The province has a total of 508 schools consisting of 444 elementary schools, 53 high schools and 11 tertiary/technical schools. A large part of the population had attained elementary or high school levels of education as reflected in Figure 3.3.3 (refer to Table 3.3.3, Supporting Report).

Figure 3.3.1 Distribution of Families by Income Class

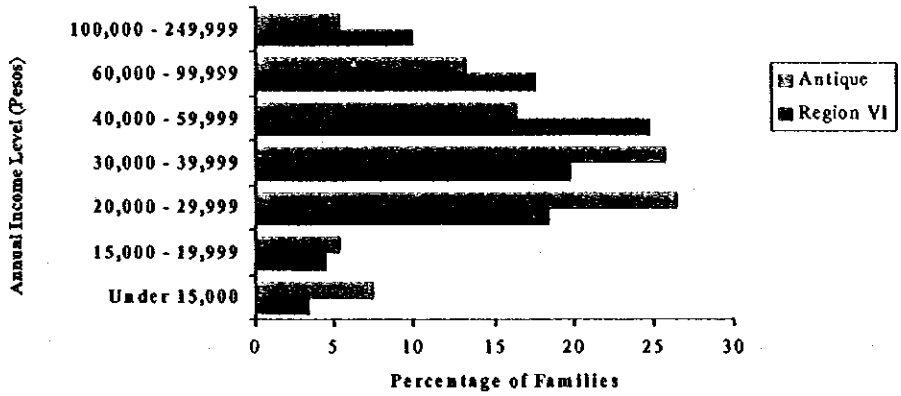


Figure 3.3.2 Employment Distribution by Major Industry and Class of Worker

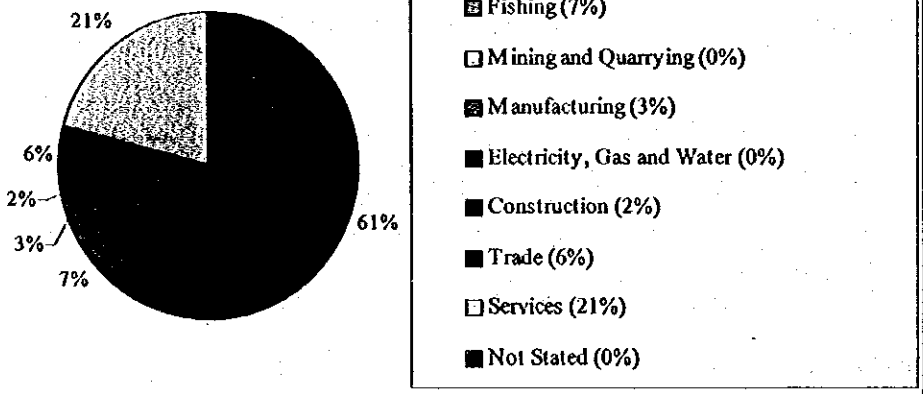


Figure 3.3.3 Population Distribution by Highest Educational Attainment

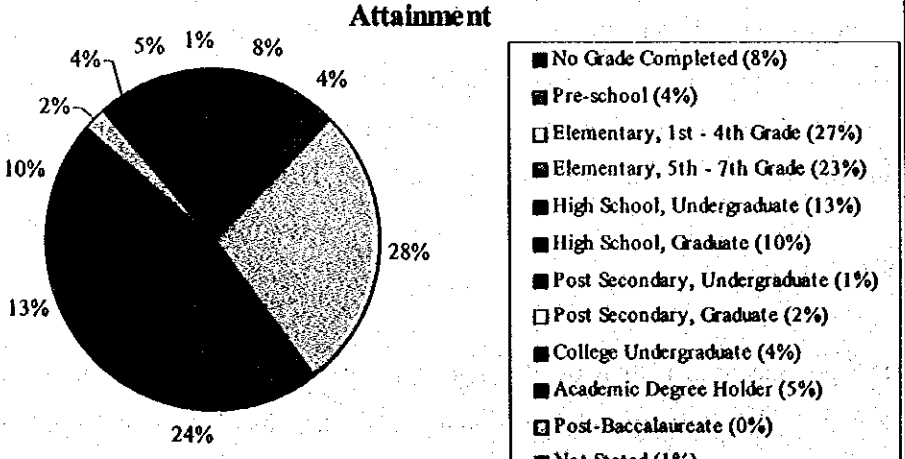


Table 3.3.1 Provincial Outline on Public Services

Item	Unit	Value	Item	Unit	Value
(1) Roads			(8) Tourism facilities	Number	22
a) Total length	Km	1,498.65	(Hotel resort, lodges, recreational		
b) Barangay roads	Percent	59.46	facilities, etc.)		
(2) Electricity service coverage			(9) Schools		
a) Municipality	Percent	100	a) Elementary level	Number	444
b) Barangay	Percent	60	b) Secondary level	Number	53
c) Household	Percent	60	c) Tertiary level/Technical	Number	11
(3) Telecommunication Services			(10) Health Facilities		
a) Availability in municipality	Percent	33	a) Hospital	Number	9
b) Telegraph station	Number	4	b) Main health centers, rural health	Number	152
c) Telephone exchanges	Number	4	units, barangay health center, etc		
(4) Post Office	Number	18	(11) Labor		
			a) Labor force participation ratio	Percent	58.45
(5) Transportation services	Mode	Bus, Jeep,	b) Employment rate	Percent	
	(ex. Bus,	Taxi,Van,			
	jeep, taxi,.)	Tricycle	(12) Average family income		
		Ship	a) Monthly income	Pesos/Month	3,533
(6) Banking Facilities	Number	52	b) Monthly expenditure	Pesos/Month	3,559
a) Private bank	(by Private				
b) Public bank	and public)				
(7) Industrial/business/commercial					
Establishment	Number	33			

Sources: PSPT, Provl. Socioeconomic Profile Dev., 1995Population Census, 1994 Family Income and Expenditures Survey

Table 3.3.2 Public Facilities and Services by Municipality

Municipality	High School			Technical-School	College	Hospital	Public Market	Bank and Financing Institution
	Public	Private	Total					
	nos.	nos.	nos.	nos.	nos.	nos.	nos.	nos.
Anini-y	2	2	4				3	3
Barbaza	1	1	2			1	1	3
Belison	1		1				1	2
Bugasong	2	1	3	2		1	1	2
Caluya	2	1	3		1	1		1
Culasi	2	1	3	1	1	1	1	2
Hamtic	3		3				1	4
Laua-an	2		2				1	3
Libertad	1		1				1	3
Pandan	4	1	5			1	1	3
Patnongon	3	1	4				1	3
San Jose de Buenavista	1	1	2	1	3	1	2	10
San Remigio	2	1	3				1	
Sebaste	1	1	2				1	3
Sibalom	4		4		1	1	1	3
Tibiao	1	1	2		1		1	3
Tobias Fornier	6	1	7			1	1	2
Valderrama	1	1	2			1	1	2
Provincial Total	39	14	53	4	7	9	20	52

3.4 Population

3.4.1 Previous Population Development

A fluctuating provincial population growth rate had been experienced since the last six (6) census years (1960-1995) as indicated in Figure 3.4.1. From an average annual growth rate of 1.95% during the period 1960 to 1970, it increased to 2.26% (1975-1980) and decreased again to 1.14% (1990-1995). A summary of the average annual growth rates of the province is as follows:

Year	Population	Ave. Annual Growth Rate (%)	Period
1970	289,172	1.95	1960 - 1970
1975	308,484	1.30	1970 - 1975
1980	344,879	2.26	1975 - 1980
1990	406,361	1.65	1980 - 1990
1995	431,713	1.14	1990 - 1995

A consideration on how the population growth behaved in the past and how it is likely to behave in the future is important because of the issue of resource allocation including the water supply and sanitation sector requirements.

The 1998 population was estimated to provide the planning base for this Master Plan (refer to Section 8.3.1 Population Projection, Main Report). Table 3.4.1 shows a breakdown of the past population development by municipality from 1948 to 1995.

Figure 3.4.1 Previous Population Development of the Province

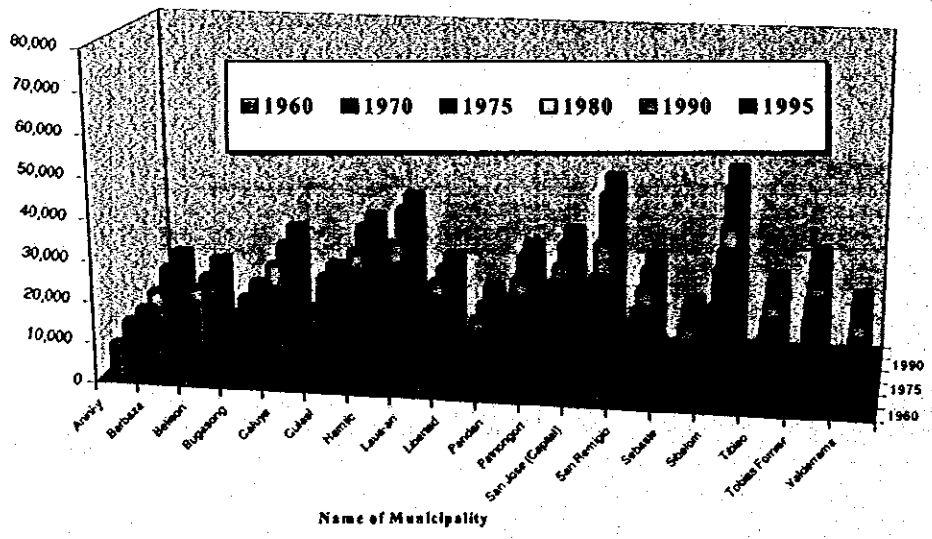


Table 3.4.1 Previous Population Development by Municipality

Municipality	Previous Population						
	1948	1960	1970	1975	1980	1990	1995
Anini-y		8,792	11,590	11,740	13,480	16,851	18,657
Barbaza	11,225	10,222	12,812	13,404	14,703	14,984	17,313
Belison			7,189	7,627	8,626	10,095	11,174
Bugasong	15,642	16,635	17,697	17,988	21,619	24,537	26,721
Caluya	4,779	5,993	7,932	8,870	10,901	16,243	17,101
Culasi	20,601	23,923	22,621	23,584	25,674	29,719	30,431
Hamtic		18,534	22,987	24,967	28,526	34,394	36,167
Laua-an	15,438	12,967	15,461	17,498	18,785	19,865	21,069
Libertad		7,568	8,945	9,176	9,870	11,049	13,274
Pandan	21,532	19,788	17,215	18,661	20,396	23,894	24,978
Patnongon	23,145	23,207	22,443	22,643	24,262	27,376	29,235
San Jose de Buenavista	34,639	17,124	23,384	24,730	30,266	40,267	42,927
San Remigio	11,536	13,293	16,567	17,134	19,208	21,682	22,869
Sebaste			8,773	9,205	10,369	12,553	12,438
Sibalom	28,558	24,468	30,392	32,247	35,515	42,647	46,143
Tibiao	13,321	11,879	14,280	15,935	17,200	20,192	19,628
Tobias Fornier	23,702	15,329	19,063	21,139	22,511	25,816	26,155
Valderrama	9,388	8,683	9,821	11,936	12,968	14,197	15,433
Provincial Total	233,506	238,405	289,172	308,484	344,879	406,361	431,713

3.4.2 Classification of Urban and Rural Areas

NSO classifies a barangay as urban when it satisfies any of the following conditions on the economic and social functions.

(1) In their entirety, all cities and municipal jurisdictions having a population density of at least 500 persons per square kilometer.

(2) Poblaciones or central districts of municipalities and cities, which have a population density of at least 500 persons per square kilometer.

(3) Poblaciones or central districts (not included in nos. 1 and 2) regardless of population size, which have the following:

1) Street pattern, i.e., network of streets either at parallel or in right angle orientation;
2) At least six establishments (commercial, manufacturing, recreational and/or personal services); and
3) At least three of the following:
   a) a town hall, church or chapel with religious services at least once a month;
   b) a public plaza, park or cemetery;

c) a market place or building where trading activities are carried on at least once a week; and

d) a public building like school, hospital, health center or library.

(4) Barangays having at least 1,000 inhabitants, that meet the condition set forth in no. 3 above, and in which the occupation of the inhabitants is predominantly non-farming/fishing.

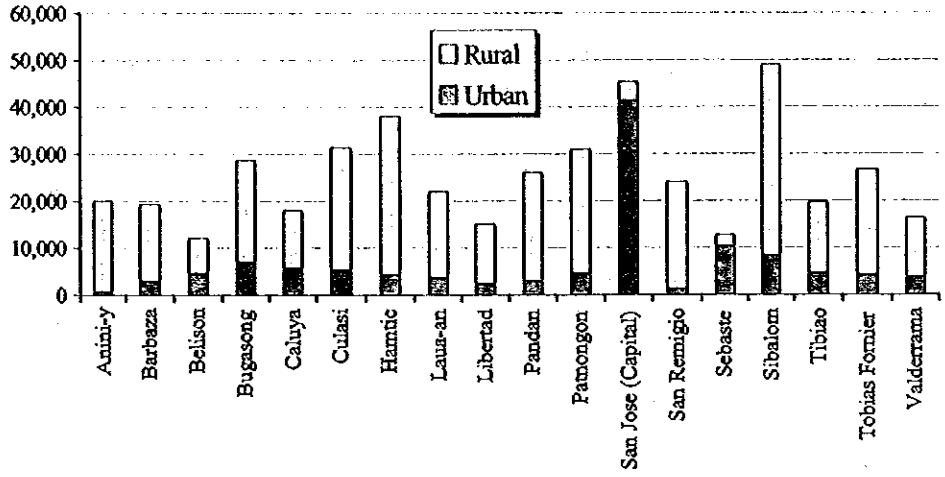
All areas not falling under the urban classification are defined as rural area. For this Master Plan, the 1995 NSO classification of urban and rural barangays was modified by the PSPT to reflect the actual condition prevailing in the area. Three (3) urban barangays were re-classified as rural. With the re-classification, there are 69 urban barangays and 521 rural barangays for a total of 590 barangays in 1998. . Distribution of the classified areas is shown in Figure 3.4.1, Supporting Report.

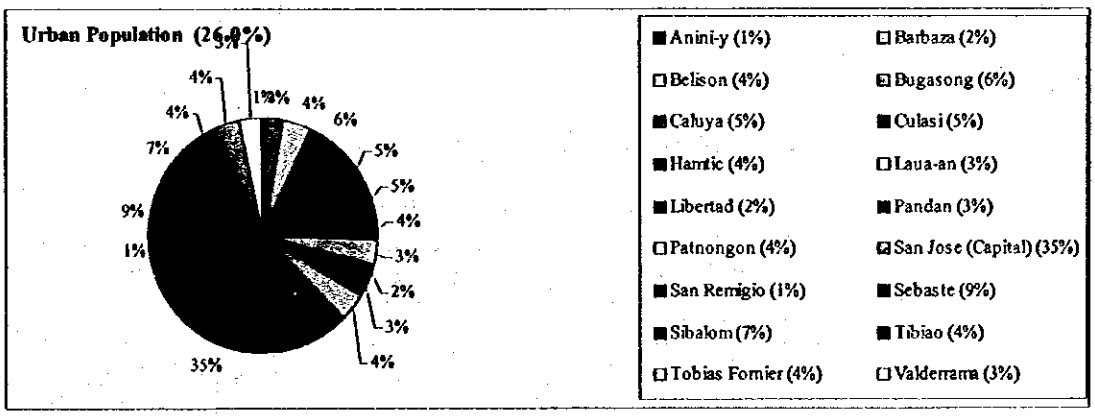
3.4.3 Present Population Distribution

From the 1995 NSO census, the 1998 urban-rural population was estimated. Rural population accounts for 74% of the provincial total, while 26% is urban as reflected in Figure 3.4.2. Table 3.4.2 presents the breakdown of the number of urban and rural barangays by municipality and its corresponding present population distribution.

There are 88,886 households with 65,774 residing in rural areas and 23,112 households in urban areas. The average provincial household size is 5.12 persons/household. Table 3.4.3 presents a breakdown per municipality on the number of households and household sizes by urban and rural area.

Figure 3.4.2 Present Population Distribution





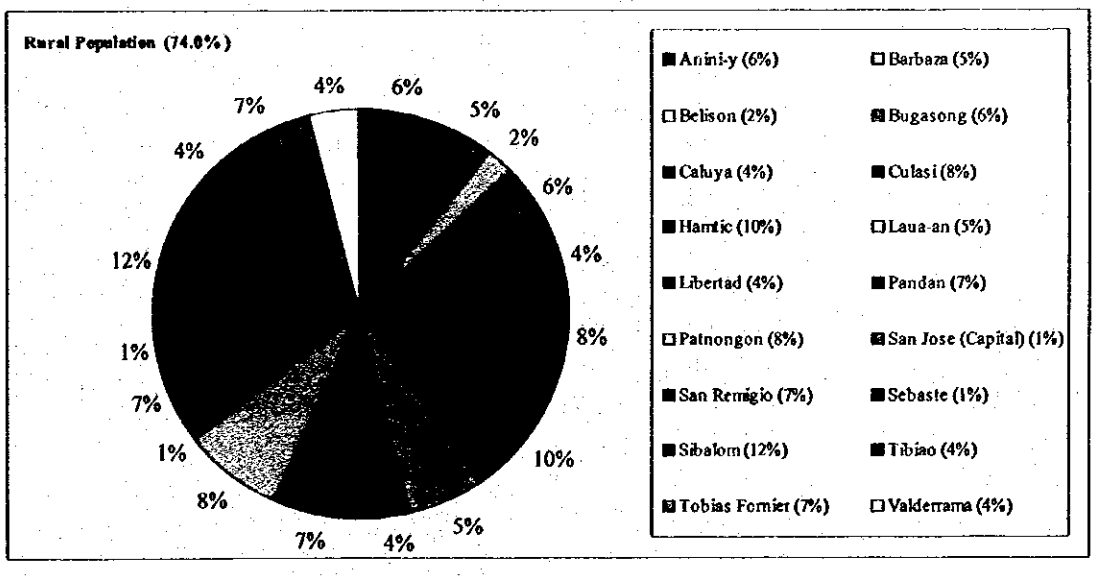


Table 3.4.2 Outline of Urban and Rural Areas in the Province

Municipality	Number of Barangay			Population (1998)		
	Urban	Rural	Total	Urban	Rural	Total
Anini-y	1	22	23	765	19,376	20,141
Barbaza	2	37	39	2,924	16,251	19,175
Belison	1	10	11	4,809	7,252	12,061
Bugasong	4	23	27	7,034	21,527	28,561
Caluya	2	16	18	5,540	12,372	17,912
Culasi	3	41	44	5,444	25,903	31,347
Hamtic	5	42	47	4,181	33,674	37,855
Laua-an	2	38	40	3,775	18,391	22,166
Libertad	2	17	19	2,218	12,831	15,049
Pandan	3	31	34	3,126	22,925	26,051
Patnongon	1	35	36	4,739	26,145	30,884
San Jose de Buenavista	23	5	28	41,483	3,818	45,301
San Remigio	1	44	45	1,236	22,744	23,980
Sebaste	6	4	10	10,311	2,251	12,562
Sibalom	5	71	76	8,354	40,776	49,130
Tibiao	2	19	21	4,584	15,044	19,628
Tobias Fornier	4	46	50	4,407	22,364	26,771
Valderrama	2	20	22	3,561	12,917	16,478
Provincial Total	69	521	590	118,491	336,561	455,052

Table 3.4.3 Household Numbers and Household Size

Municipality	Number of Households (1995)			Number of Households (1998)			1995 Household Size (person/household)		
	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total
Anini-y	125	3,238	3,363	135	3,496	3,630	5.67	5.54	5.55
Barbaza	495	2,851	3,346	548	3,158	3,706	5.33	5.15	5.17
Belison	841	1,342	2,183	908	1,448	2,356	5.30	5.01	5.12
Bugasong	1,286	3,960	5,246	1,375	4,233	5,607	5.12	5.09	5.09
Caluya	997	2,224	3,221	1,044	2,329	3,374	5.30	5.31	5.31
Culasi	1,045	5,004	6,049	1,076	5,155	6,231	5.06	5.03	5.03
Hamtic	785	6,177	6,962	822	6,465	7,287	5.09	5.21	5.19
Laua-an	712	3,617	4,329	749	3,805	4,554	5.04	4.83	4.87
Libertad	371	2,054	2,425	421	2,329	2,749	5.27	5.51	5.47
Pandan	617	4,412	5,029	644	4,601	5,245	4.86	4.98	4.97
Patnongon	889	5,020	5,909	939	5,303	6,242	5.05	4.93	4.95
San Jose de Buenavista	7,619	738	8,357	8,040	779	8,819	5.16	4.90	5.14
San Remigio	245	4,072	4,317	257	4,270	4,527	4.81	5.33	5.30
Sebaste	2,035	436	2,471	2,055	440	2,496	5.02	5.11	5.03
Sibalom	1,484	7,398	8,882	1,580	7,877	9,457	5.29	5.18	5.20
Tibiao	982	3,075	4,057	982	3,075	4,057	4.67	4.89	4.84
Tobias Fornier	806	4,353	5,159	825	4,456	5,281	5.34	5.02	5.07
Valderrama	667	2,393	3,060	712	2,555	3,267	5.00	5.06	5.04
Provincial Total	22,001	62,364	84,365	23,112	65,774	88,886	5.12	5.11	5.12

3.5 Health Status

3.5.1 Morbidity, Mortality and Infant Mortality

The number one cause of morbidity in Antique was pneumonia, followed by bronchitis, diarrhea and influenza. Tuberculosis and skin diseases ranked fifth and sixth, respectively. Regarding mortality, the number one cause was pneumonia, followed by heart diseases. Vascular diseases and tuberculosis ranked third and fourth, respectively. Pneumonia, prematurity and congenital anomalies were the 3 leading causes of infant mortality in the province (refer to Table 3.5.1, Data Report).

The general health status of the populace of the province in 1998 was relatively poor compared with the national condition. The incidence of diseases was higher in Antique than the country as a whole. Table 3.5.1 presents a comparative statistics on the ten leading causes of morbidity, mortality and infant mortality of the province as well as of the Philippines.

Water-related diseases in the ten leading causes of morbidity include diarrhea (rank 3rd), skin diseases (6th), dengue fever (7th) and intestinal parasitism (9th). Diarrhea (rank 6th) and gastroenteritis (8th) were among the ten leading causes of infant mortality.

3.5.2 Water Related Diseases

An indicator of health problems related to water supply and sanitation is the incidence of water-related diseases. The World Health Organization (WHO) has classified diseases related to water into four (4) categories: 1) water-borne diseases e.g., cholera, typhoid, hepatitis A, diarrhea and dysentery; 2) water-based diseases e.g., schistosomiasis; 3) water-washed diseases e.g., diarrhea, intestinal parasitism, scabies, conjunctivitis (sore eyes), and skin diseases; and 4) water-vector related diseases e.g., malaria, filariasis and dengue or H-fever. As with malaria, the control of filariasis is beyond this Master Plan. A safe water supply, sanitary toilet and proper hygiene practices are conditions necessary for the control and prevention of these diseases.

Water-related diseases reported in the province in 1998 were intestinal parasitism, diarrhea, conjunctivities, dengue fever, viral hepatitis, gastroenteritis/colitis, scabies and skin diseases. Table 3.5.2 presents the reported cases and deaths of notifiable water-related diseases in the province.

Table 3.5.1 Number and Rates of Ten Leading Causes of Morbidity, Mortality and Infant Mortality

Rate: 1/100,000

	Causes	Antique		Philippines		
		Number	Rate	Number	Rate	Ranking
Morbidity	1. Pneumonia	11,692	2,569.4	470,574	703	4
	2. Bronchitis	6,539	1,437.0	903,508	1,349	2
	3. Diarrhea	5,732	1,259.6	1,337,449	1,997	1
	4. Influenza	3,237	711.3	609,471	910	3
	5. Tuberculosis	1,969	432.7	159,049	238	6
	6. Skin Diseases	1,524	334.9	-		
	7. Dengue Fever	1,442	316.9	-		
	8. ARI	1,276	280.4	-		
	9. Intestinal Parasitism	1,237	271.8	-		
	10. Anemias	1,083	238.0	85,345	127	8
Mortality	1. Pneumonia	964	211.8	35,582	53	3
	2. Heart Diseases	300	65.9	48,582	69	1
	3. Vascular Diseases	282	62.0	37,358	56	2
	4. Tuberculosis	213	46.8	24,580	37	5
	5. Other Accidents	71	15.6	13,477	20	6
	6. Septicemia	50	11.0	-		
	7. Kidney/Nephritis	48	10.5	5,510	8	10
	8. Chronic Liver Disease	19	4.2	-		
	9. Diabetes Mellitus	6	1.3	-		
	10. Measles	4	0.9	-		
Infant Mortality	1. Pneumonia	45	9.9	7,631	4.5	1
	2. Prematurity	20	4.4	-		
	3. Congenital Anomalies	19	4.2	2,366	1.4	3
	4. Septicemia	8	1.8	1,252	0.7	5
	5. Resp. Fetus/Newborn	8	1.8	5,651	3.4	2
	6. Diarrhea	3	0.7	1,661	1.0	4
	7. Meningitis	3	0.7	-		
	8. Gastroent. Colitis	1	0.2	-		
	9. Typhoid/Parathyphoid	0	0.0			
	10. Dysentery	0	0.0			

Table 3.5.2 Reported Cases and Deaths of Notifiable Water Related Diseases in 1998

Rate: 1/100,000

Diseases	Morbidity		Mortality		Infant Mortality	
	Number	Rate	Number	Rate	Number	Rate
Water-borne						
1. Diarrhea	5,732	1,328			3	0.7
2. Viral hepatitis			2	0.5		
3. Gastoenteritis Colitis	586	135			1	0.2
Water-washed						
1. Intestinal parasitism	1,237	287				
2. Conjunctivities	675	156				
3. Scabies	461	107				
4. Skin disease	1,524	353				
Water vector						
1. Dengue/H-fever	1,442	334				

3.5.3 Health Facilities and Practitioners

Present facilities serving the health care of the populace are 9 hospitals, 18 rural health units and 134 barangay health stations. The ratio of the population to these facilities and to the health practitioners are relatively higher as compared to the national average figures (refer to Table 3.5.1 number and ratio of population to health facilities and/or medical practitioners, Supporting Report).

3.6 Environmental Conditions

3.6.1 General

Environmental issues and problems directly affecting the sector and/or how the sector affects these environmental concerns are dealt with in this sub-section. Specifically, the problems of water pollution and solid waste disposal spawned by rapid population growth and increasing industrial and economic activities are discussed. These problems put a strain on the provincial water resources and hinder their optimum utilization.

3.6.2 Water Pollution

There are no existing sanitary sewerage systems in the province. Majority of the drainage facilities in all municipalities is open canals or ditches. The rivers and streams function as the drainage system. These rivers receive the domestic wastewater and storm water collected by the segmented drainage facilities in urban centers or poblacions (refer to the types of drainage facilities in Table 3.6.1, Supporting Report).

A major water pollution source in urban areas is domestic wastewater. Graywater generated by households is simply allowed to discharge into nearby channels. Effluent from septic tanks or cesspools is also flowing into the streams. The other major pollutant is dumped refuse that finds its way to the river systems during rain or is thrown indiscriminately into the rivers. In rural areas, natural assimilation of the river may be expected to purify organic substances. However, pollution or contamination is anticipated caused by agricultural activities especially with reference to fertilizers and pesticides.

Domestic sewage is identified as potential pollution sources in the province if no control measures are in place. The rivers must be protected and conserved for their intended or beneficial use. However, as of now, the rivers in the province have not been classified as to their usage by the Department of Environment and Natural Resources (refer to general in-

formation in Table 3.6.2 DENR Water Quality Criteria/Water Usage and Classification, Supporting Report).

3.6.3 Solid Waste Disposal

Of the 18 municipalities/city, only 9 have municipal refuse collection services as of 1998 (details are referred to Table 3.6.1, Data Report). These municipalities have 1 unit each of open dump truck. In the province, 16% of the households is served, while the majority (86%) is unserved. Table 3.6.1 reflects the manner of solid waste collection and disposal, and service coverage by municipality in 1998.

Open dumping is commonly practiced by the LGUs as disposal of solid wastes. The dumped refuse is usually burned or left unattended. Some significant negative effects associated with this unsanitary method are surface and groundwater pollution, air pollution, scattered solid waste, breeding grounds for insects, rodents and other disease vectors and fire hazard. At the household level, unserved households by the LGUs primarily depend on individual waste disposal such as dumping in vacant lots or body of water, burying and composting.

Table 3.6.1 Municipal Solid Waste Collection and Disposal, and Service Coverage, 1998

Name of Municipality	Number of Households 1998	With Service						Without Service				Percentage of Households Served	Percentage of Households Unserved
		Number of Collection Trucks			Disposal			Manner of Disposal (Number of Household)					
		Open Dump Trucks	Closed Type Trucks	Total Units	Number of Households Served by Open Dump Site	Number of Households Served by Sanitary Landfill	Total Households Served	Dumping (Land and Water)	Burying	Composting	Total Households Unserved		
Anini-y	3,630							705	2,455	470	3,630		100
Barbaza	3,706							680	2,446	580	3,706		100
Belison	2,356							870	1,126	360	2,356		100
Bugasong	5,607	1		1	2,105		2,105	409	2,523	570	3,502	38	62
Caluya	3,374							1,141	1,963	270	3,374		100
Culasi	6,231	1		1	1,057		1,057	2,003	2,286	885	5,174	17	83
Hamtic	7,287	1		1	615		615		2,603	4,069	6,672	8	92
Laua-an	4,554	1		1	312		312		4,242		4,242	7	93
Libertad	2,749							420	2,009	320	2,749		100
Pandan	5,245	1		1	855		855	658	3,373	359	4,390	16	84
Patnongon	6,242	1		1	1,520		1,520	1,977	2,545	200	4,722	24	76
San Jose (Capital)	8,819	1		1	4,310		4,310	1,874	2,125	510	4,509	49	51
San Remigio	4,527							780	3,632	115	4,527	.	100
Sebaste	2,496							875	1,296	325	2,496		100
Sibalom	9,457	1		1	2,705		2,705		5,247	1,505	6,752	29	71
Tibiao	4,057								2,032	2,025	4,057		100
Tobias Fornier	5,281	1		1	489		489	302	2,456	2,034	4,792	9	91
Valderrama	3,267							1,206	2,061		3,267		100
Provincial Total	88,886	9		9	13,968		13,968	13,900	46,420	14,597	74,917	16	84

Chapter 4

EXISTING FACILITIES AND SERVICE COVERAGE

4. EXISTING FACILITIES AND SERVICE COVERAGE

4.1 Water Supply

4.1.1 General

Existing water supply facilities and conditions were surveyed by municipality under the category of urban and rural areas (as of October 1999 and regarded as a figure in 1998). Facilities are classified into three service levels, of which Level I facilities are further classified into safe and unsafe for drinking purpose.

The percentages of service coverage by different service level were estimated covering urban and rural areas by municipality. The served population is defined as "population served adequately with access to safe water sources/facilities." The rest of the population with unsafe sources/facilities and without access to water supply facilities was then defined as "underserved population" and "unserved population," respectively. The service coverage was figured out using estimated population in 1998.

Service profile and operating conditions of existing facilities are summarized by service level to come up with problem areas and need of rehabilitation to reflect in the development plan.

As a provincial total, approximately 71% of the present population (of which 26% in urban area and 74% in rural area) is considered as adequately served (refer to 4.1, Supporting Report for the detailed study). Under the area classification, 80% of urban population and 68% of rural population have access to safe water sources/facilities, while the rest is underserved or unserved. About 221,200 persons or 68% of the served population depend on Level I facilities, while about 103,200 persons or 32% are served by Level III and/or Level II systems.

4.1.2 Types of Facilities and Definition of Service Level Standard

(1) Composition of water supply system/facility

The NSMP defines service level and system components of the water supply systems/facilities as shown in Table 4.1.1. NEDA Board Resolution No. 12 (s. 1995) also provides the approved definition of terms relative to water supply including levels of service (refer to 4.1.2 Data Report). These terms are to be adopted by all government agencies including LGUs.

Table 4.1.1 Composition of Water Supply System/Facility by Service Level

Description	Level I (Point Source Facility)	Level II (Communal Faucet System)	Level III (Individual House Connection)
1. Water Source	Drilled/driven shallow well Drilled/driven deep well Dug well Spring Rain collector	Drilled shallow/deep well Spring Infiltration gallery	Drilled deep well Spring Infiltration gallery Surface water intake
2. Water Treatment	Generally none. Disinfection of wells is conducted periodically by local health authorities. Iron removal facilities are provided in problem areas.	Generally none	Disinfection is provided. Systems with surface water source have series of water treatment facilities.
3. Distribution	None	Piped system provided with reservoir/s	Piped system provided with reservoir/s and pumping facilities.
4. Delivery & Service Level	At point (within 250m radius)	Communal faucet (within 25m radius)	Individual house connection/household tap
5. Consumption Rate (Adequately Served)	At least 20 lpcd	At least 60 lpcd	At least 100 lpcd

(2) Safe and unsafe classification of water sources

DOH has classified Level I water source facilities as safe (reliable water source) and unsafe sources/facilities based on the National Standard for Drinking Water (NSDW).

Safe source: Protected deep well, protected shallow well, improved/covered dug well and developed spring

Unsafe source: Unprotected deep well, unprotected shallow well, open dug well, undeveloped/unprotected spring and rainwater collector

Water sources other than the above, such as untreated surface water of rivers, lakes and ponds are also considered unsafe sources. On the other hand, Levels II and III water supply systems are regarded to have safe/reliable sources with provision of adequate treatment.

(3) Service level standard

The NSMP and NEDA Resolution No. 12 define "adequate service level" by different water supply system. Improvement in the number of households per water source/facility may be expected for Level I service in the future. On the contrary, the number of households served by a unit of private/public source is sometimes beyond the standard on a current basis.

Level III: 1 household/connection

Level II: 5 (4 to 6) households/communal faucet

Level I: 15 households/point source
1 household/private well

4.1.3 Level III Systems

Level III (individual house connection) systems at municipal level are usually established and operated by WD under the technical and financial assistance of LWUA. Some LGUs also implement and operate Level III systems commonly at barangay level.

There are 13 Level III systems in the province operated under different kinds of ownership (authority or association) as shown in Table 4.1.2 together with their service coverage in 1998 (details are referred to in Table 4.1.1, Supporting Report).
These are:

- 8 Water Districts covering 6 municipalities of Barbaza, Bugasong, Culasi, Hamtic, Pandan, Patnongon, Sibalom and Tobias Fornier;
- 5 systems operated by LGUs in the municipalities of Culasi, Hamtic, San Jose, Sebaste and Tibiao.

Pandan WD, among them, is the largest system in the province, covering three (3) urban and fourteen (14) rural barangays of Pandan in provision of spring source. Current served population is about 24,000 persons or 92% of both urban and rural population.

Following Pandan WD is San Jose Rural Waterworks, the second largest system, covering nine (9) urban barangays of San Jose in provision of spring source. Current served population is about 10,000 persons or 24% of urban population (41,500).

Following San Jose WWs is Bugasong WD, the third largest system in the province. The WD covers 2 urban and 10 rural barangays of Bugasong with a served population of about 8,900 in provision of spring source.

In the municipality of Culasi, there are one (1) water district and one (1) LGU-managed Level III system. Culasi WD covers three (3) urban and six (6) rural barangays with a served population of about 5,900 in use of spring source, while LGU-managed waterworks supplies to 3 rural barangays with a served population of about 700.

Some other municipalities (Barbaza, Hamtic, Patnongon, Sebaste, Sibalom, Tibiao and Tobias Fornier) have Level III systems managed by WDs or LGUs, with their population served ranging from about 600 to 5,100 in provision of deep well/spring/surface water sources.

Generally, waterworks with spring sources are simply managed without higher expertise needed and in provision of lower water charges.

Some Level-III systems, among the above, practice scheduled water supply (intermittent water supply) due to insufficient water source capacity. Even in case of enough water sources, intermittent water supply is forced due to insufficient capacity of the facilities (distribution pipe) against current water demand. Concerned municipalities relevant to the problem are Barbaza WD and Bugasong WD. Lack of due consideration in D/D stage for expansion of the system was also observed.

All waterworks has O&M staff (engineer/technician/plumber/water fee collector) and practice chlorination. They have ensured budget for O&M cost, but the income is insufficient for expansion of the system.

The other seven (7) municipalities have no Level III system/s both in urban and rural area at present.

Table 4.1.2 Information on Existing Level III System

Name of Municipality	Name of Operating Body	Water Consumption			Service Coverage								
		Type of Water Source	Water Consumption (cu.m/day)	Domestic Supply (%)	No. of Brgys. Served			No. of Household Served			No. of Population Served		
					Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total
Barbaza	Barbaza WD	SP	187	100	2	8	10	130	337	467	770	2,002	2,772
Bugasong	Bagasong WD	DW	491	78	3	4	7	582	140	722	4,866	4,078	8,944
Culasi	Culasi - LGU		*74			3	3		153	153		735	735
	Culasi WD	SP	*589		3	6	9	691	246	937	4,455	1,439	5,894
	Municipal Total		663		3	9	12	691	399	1,090	4,455	2,174	6,629
Hamtic	Hamtic WD	DW	*158		5		5	333		333	1,575		1,575
	Malandog LGU	DW	*62			1	1		124	124		617	617
	Municipal Total		663		3	9	12	691	399	1,090	4,455	2,174	6,629
Pandan	Pandan WD	SP	*2,400		3	14	17	389	585	974	2,883	21,160	24,043
Patnongon	Patnongon WD	SP	*200		1	3	4	445	33	478	1,835	165	2,000
San Jose	San Jose - LGU	SP	*996		9		9	1,992		1,992	9,960		9,960
Sebaste	Sebaste - LGU	Surf	1,020	100	1		1	519		519	2,885		2,885
Sibalom	Sibalom WD	DW	547	100	4	2	6	1,146	266	1,412	4,614	486	5,100
Tibiao	Tibiao - LGU	SP	*255		1	2	3	305	372	677	1,228	1,318	2,546
Tobias Fornier	Tobias Fornier WD	SP	*408		3	1	4	692	78	770	3,683	394	4,077
Provincial Total			4,645	95	35	44	79	7,224	2,334	9,558	38,754	32,394	71,148

Notes: 1. Type of Water Source: *DW* - Deep Well, *Surf.* - Surface Water (River), *SP* - Spring, *IG* - Infiltration Gallery.
2. * - Estimated at 100 lpcd.

Table 4.1.3 Information on Water District

Name of Water District	Number of Connections						Production (cu. m/mon)	Accounted for Water (cu. m/mon)
	Domestic	Institutional	Commercial	Industrial	Total	Metered		
Barbaza WD	467				467	467	90,720	5,610
Bagasong WD	722		80		802	802	11,880	14,730
Culasi WD	830	33	5		868	868	18,150	
Hamtic WD	333	6			339	339	8,070	
Pandan WD	974	23	7		1,004	1,004	74,520	
Patnongon WD	478				478	476	26,640	
Sibalom WD	850			8	858	858	14,580	16,400
Tobias Fornier WD	770				770	770	7,200	

4.1.4 Level II Systems

Level II (communal faucet) systems are designed to cater for barangay level water supply with limited service coverage and supply capacity. These systems have been implemented by different agencies (DPWH, LWUA, DILG, LGUs) encouraging the use of spring sources and are operated by LGUs or RWSAs.
There are a total of 214 Level II systems in 15 municipalities of the province. The majority is utilizing spring sources (212 systems), while only 2 systems in Belison use deep wells (details are referred to in Table 4.1.2, Supporting Report). The municipality of Sibalom has the largest number, 30 systems or 14% of the total as shown in Table 4.1.4 together with service coverage in 1998.

Problem areas, both in managerial and technical aspects, identified on existing Level II systems and necessary countermeasures for the improvements are discussed hereunder.

(1) Management practice

Some waterworks impose a flat rate water charge of mostly 5 to 30 Pesos/HH/month and the rest supplies water free of charge. Regarding repair works, there are two (2) cases for reactions; the associations collect required money from beneficiaries, or resort to assistance of barangay. Likewise, they request assistance of MEO/PEO case by case. This fact shows that that current management practices will lead to any one of these systems to become non-operational sooner or later. This is because the financial savings to cope with future repair and depreciation of existing facilities are not duly considered under the current management practice, while cost recovery by the operating bodies is a prerequisite in sector management.

To attain financial and managerial sustainability, reinforcement of RWSA or other operating body shall be promoted with reference to institutional development.

(2) Technical skill for O&M of facilities

Utilization of spring source usually leads to less attention to the daily O&M practice, owing to gravity flow of water to the service area. However, inappropriate care of spring box and pipeline results to various problems, e.g. turbid water, less water flow by clogging at spring box and pipeline, etc.

Physical damage may also happen to the transmission line exposed on the ground in the mountainous area due to landslide, etc. associated with heavy rainfall, when proper protection of pipeline is not taken up.

Table 4.1.4 Information on Existing Level II System

Name of Municipality	Name of Operating Body	Service Coverage								
		No. of Brgys. Served			No. of Household Served			No. of Population Served		
		Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total
Anini-y	Bayo Grande		1	1		30	30		150	150
	Bayo Pequeño		1	1		25	25		125	125
	Casay		1	1		20	20		100	100
	Iba		1	1		20	20		100	100
	Igtumarom		1	1		15	15		75	75
	Lisub B		1	1		20	20		100	100
	Mabuyong		1	1		15	15		75	75
	Salvacion		1	1		10	10		50	50
	San Ramon		1	1		15	15		75	75
	Tagaytay		1	1		20	20		100	100
	Municipal Total		10	10		190	190		950	950
Belison	Borocboroc BWSA		1	1		20	20		100	100
	Buenavista BWSA		1	1		60	60		300	300
	Mojon BWSA		1	1		50	50		250	250
	Municipal Total		3	3		130	130		650	650
Bugasong	Camangahan WWS		1	1		65	65		325	325
	Guija-Sabang West		2	2		230	230		1,150	1,150
	Ilaures Spring System		1	1		100	100		500	500
	Zaragoza		1	1		80	80		400	400
	Municipal Total		5	5		475	475		2,375	2,375
Culasi	Batbatan Island		1	1		20	20		100	100
	Bitadton Norte		1	1		20	20		100	100
	Flores		1	1		40	40		200	200
	Magsaysay		1	1		20	20		100	100
	Malalison Island		1	1		10	10		50	50
	Osorio		1	1		20	20		100	100
	San Pascual		1	1		30	30		150	150
	Simbola		1	1		40	40		200	200
	Tigbobolo		1	1		40	40		200	200
	Municipal Total		9	9		240	240		1,200	1,200
Hamtic	Apdo		1	1		20	20		100	100
	Banawon		1	1		45	45		225	225
	Bongbongan III		1	1		30	30		150	150
	Botbot		1	1		30	30		150	150
	Bubudan		1	1		20	20		100	100
	Calacja I		1	1		25	25		125	125
	Calacja II		1	1		20	20		100	100
	Caromangay		1	1		20	20		100	100
	Casalngan		1	1		25	25		125	125
	Dangcalan		1	1		25	25		125	125
	Evelio B. Javier		1	1		20	20		100	100
	Fabrica		1	1		30	30		150	150
	General Fullon		1	1		15	15		75	75
	Igbucagay		1	1		20	20		100	100
	Linaban		1	1		65	65		325	325
	Mapatag		1	1		15	15		75	75
	Poblacion 5	1		1	40		40	200		200
	Municipal Total	1	16	17	40	425	465	200	2,125	2,325
Laua-an	Banban		1	1		50	50		250	250
	Capnayan		1	1		20	20		100	100
	Casit-an		1	1		50	50		250	250
	Guiamon		1	1		20	20		100	100
	Intao		1	1		75	75		375	375
	Jaguikican		1	1		75	75		375	375
	Jinalinan		1	1		25	25		125	125
	Leon		1	1		40	40		200	200
	Liberato		1	1		20	20		100	100
	Lindero		1	1		75	75		375	375
	Liya-liya		1	1		25	25		125	125
	Maria		1	1		75	75		375	375
	Mauno		1	1		40	40		200	200
	Maybunga		1	1		20	20		100	100
	Pandanan		1	1		20	20		100	100
	Paniatan		1	1		25	25		125	125
	Paningayan		1	1		30	30		150	150
	San Ramon		1	1		15	15		75	75
	Santiago		1	1		30	30		150	150
	Virginia		1	1		25	25		125	125

Table 4.1.4 Information on Existing Level II System (cont'd)

Name of Municipality	Name of Operating Body	Service Coverage								
		No. of Brgys. Served			No. of Household Served			No. of Population Served		
		Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total
Laua-an	**Municipal Total**		20	20		755	755		3,775	3,775
Libertad	Codiong WWS		1	1		25	25		125	125
	Igcagay WWS		1	1		25	25		125	125
	Inyawan WWS		1	1		50	50		250	250
	Lindero BWSA		1	1		60	60		300	300
	Paz		1	1		50	50		250	250
	Pucio WS		1	1		70	70		350	350
	San Roque		1	1		25	25		125	125
	Tinigbas		1	1		75	75		375	375
	Tinindugan		1	1		15	15		75	75
	Municipal Total		9	9		395	395		1,975	1,975
Pandan	Atacay		1	1		20	20		100	100
	Badiangan		1	1		20	20		100	100
	Listoga		1	1		10	10		50	50
	Maadios		1	1		25	25		125	125
	Perfecta		1	1		30	30		150	150
	San Joaquin		1	1		40	40		200	200
	Santa Ana		1	1		30	30		150	150
	Municipal Total		7	7		175	175		875	875
Patnongon	Alvaniz		1	1		15	15		75	75
	Badiangan		1	1		20	20		100	100
	Bitas		1	1		25	25		125	125
	Cuyapiao		1	1		25	25		125	125
	Gella		1	1		15	15		75	75
	Igbarawan		1	1		25	25		125	125
	Igburi		1	1		50	50		250	250
	La Rioja		1	1		70	70		350	350
	Mabasa		1	1		30	30		150	150
	Macarina		1	1		25	25		125	125
	Magarang		1	1		15	15		75	75
	Pandanan.		1	1		20	20		100	100
	Patlabawon		1	1		20	20		100	100
	Quezon		1	1		20	20		100	100
	Salaguiawan		1	1		15	15		75	75
	San Rafael		1	1		25	25		125	125
	Tamayoc		1	1		25	25		125	125
	Tigbalogo		1	1		25	25		125	125
	Tobias Fornier		1	1		20	20		100	100
	Villa Crespo		1	1		100	100		500	500
	Villa Cruz		1	1		25	25		125	125
	Villa Elio		1	1		15	15		75	75
	Villa Flores		1	1		25	25		125	125
	Villa Laua-an		1	1		50	50		250	250
	Villa Sal		1	1		65	65		325	325
	Villa Salomon		1	1		50	50		250	250
	Vista Alegre		1	1		75	75		375	375
	Municipal Total		27	27		890	890		4,450	4,450
San Jose (capital)	Bariri		1	1		10	10		50	50
	Pantao		1	1		20	20		100	100
	San Angel	1		1	30		30	150		150
	Municipal Total	1	2	3	30	30	60	150	150	300
San Remigio	Aningalan		1	1		60	60		300	300
	Iguirindon		1	1		25	25		125	125
	La union		1	1		125	125		625	625
	Nagbangi I		1	1		85	85		425	425
	Nagbangi II		1	1		65	65		325	325
	Osorio I		1	1		75	75		375	375
	Osorio II		1	1		25	25		125	125
	Pandanan I		1	1		15	15		75	75
	Poblacion		1	1		15	15		75	75
	Municipal Total		9	9		490	490		2,450	2,450
Sebaste	Abiera	1		1	65		65	325		325
	Aguila	1		1	30		30	150		150
	Alegre		1	1		15	15		75	75
	Bacalan	1		1	15		15	75		75
	Brgy. Poblacion	1		1	30		30	150		150
	Municipal Total	4	1	5	140	15	155	700	75	775
Sibalom	Bad-as					20	20		100	100
	Bongbongan I		1	1		30	30		150	150
	Bongbongan II		1	1		50	50		250	250

Table 4.1.4 Information on Existing Level II System (cont'd)

Name of Municipality	Name of Operating Body	Service Coverage								
		No. of Brgys. Served			No. of Household Served			No. of Population Served		
		Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total
Sibalom	Bulalacao	1		1	15		15	75		75
	Cabariuan		1	1		25	25		125	125
	Cabladan		1	1		10	10		50	50
	Calog		1	1		10	10		50	50
	Calo-oy		1	1		25	25		125	125
	Capoldolan		1	1		25	25		125	125
	Cubay-Semmon		1	1		20	20		100	100
	Esperanza II		1	1		10	10		50	50
	Esperanza III		1	1		20	20		100	100
	Igbanolong		1	1		10	10		50	50
	Igcococ		1	1		15	15		75	75
	Igdagmay		1	1		30	30		150	150
	Imparayan		1	1		15	15		75	75
	Inabasan		1	1		15	15		75	75
	Initan		1	1		15	15		75	75
	Lacaron		1	1		30	30		150	150
	Lambayagan		1	1		10	10		50	50
	Luyang		1	1		15	15		75	75
	Nagdayao		1	1		20	20		100	100
	Odiong		1	1		20	20		100	100
	Panlagangan		1	1		10	10		50	50
	Pasong		1	1		15	15		75	75
	Solong		1	1		45	45		225	225
	Tabong-tabong		1	1		10	10		50	50
	Tigbalua I		1	1		10	10		50	50
	Tigbalua II		1	1		25	25		125	125
	Tula-tula		1	1		35	35		175	175
	Villafont		1	1		10	10		50	50
	Municipal Total	1	29	30	15	600	615	75	3,000	3,075
Tibiao	Castillo		1	1		25	25		125	125
	Esparagoza		1	1		35	35		175	175
	Importante		1	1		40	40		200	200
	La Paz		1	1		45	45		225	225
	Martinez		1	1		40	40		200	200
	Natividad		1	1		25	25		125	125
	Pitac		1	1		25	25		125	125
	San Francisco Norte		1	1		40	40		200	200
	Santa Ana		1	1		30	30		150	150
	Santa Justa		1	1		95	95		475	475
	Tigbaboy		1	1		60	60		300	300
	Tuno		1	1		70	70		350	350
	Municipal Total		12	12		530	530		2,650	2,650
Tobias Fornier	Abaca WS	1		1	30		30	150		150
	Atiotes WS		1	1		20	20		100	100
	Balloscas WSS		1	1		40	40		200	200
	Barasanan A WSS		1	1		25	25		125	125
	Barasanan B WWS		1	1		35	35		175	175
	Barasanan C WWS		1	1		15	15		75	75
	Bariri WWS		1	1		25	25		125	125
	Camandagan WS		1	1		25	25		125	125
	Cato-ogan WWS		1	1		50	50		250	250
	Diclum WS		1	1		20	20		100	100
	Fatima WS		1	1		50	50		250	250
	Gamad WS		1	1		50	50		250	250
	Igbangcal-A WS		1	1		50	50		250	250
	Igbangcal-B WS		1	1		40	40		200	200
	Igbangcal-C WWS		1	1		15	15		75	75
	Igcadac WWS		1	1		25	25		125	125
	Igcado WS		1	1		25	25		125	125
	Igcasicad WS		1	1		25	25		125	125
	Lawigan		1	1		25	25		125	125
	Manaling WS		1	1		20	20		100	100
	Nagsubuan WS		1	1		30	30		150	150
	Nasuli-A WWS		1	1		20	20		100	100
	Opsan WSS		1	1		30	30		150	150
	Paciencia WS		1	1		50	50		250	250
	Sto. Tomas WS		1	1		30	30		150	150
	Ysulat WWS		1	1		50	50		250	250
	Municipal Total	1	25	26	30	790	820	150	3,950	4,100
Valderama	Alon Spring Dev.		1	1		10	10		50	50

Table 4.1.4 Information on Existing Level II System (cont'd)

Name of Municipality	Name of Operating Body	Service Coverage								
		No. of Brgys. Served			No. of Household Served			No. of Population Served		
		Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total
Valderama	Bakiang Spring Dev.		1	1		15	15		75	75
	Binanongan WS		1	1		40	40		200	200
	Borocboroc Spring Dev		1	1		30	30		150	150
	Bugnay Spring Dev.		1	1		15	15		75	75
	Buluangan I		1	1		10	10		50	50
	Buluangan I (LGU)		1	1		20	20		100	100
	Buluangan II		1	1		30	30		150	150
	Bunsod		1	1		140	140		700	700
	Buri, Brgy. Bugnay		1	1		20	20		100	100
	Busog		1	1		10	10		50	50
	Cananghan		1	1		10	10		50	50
	Canipayan		1	1		20	20		100	100
	Cansilayan		1	1		10	10		50	50
	Culyat		1	1		10	10		50	50
	Iglinab Spring Dev.		1	1		55	55		275	275
	Igmasandig		1	1		20	20		100	100
	Lublub		1	1		20	20		100	100
	Pandanan		1	1		20	20		100	100
	San Agustin		1	1		25	25		125	125
	Tigmamale		1	1		50	50		250	250
	Ubos-takas WWS	2		2	1,150		1,150	5,750		5,750
	Municipal Total	2	21	23	1,150	580	1,730	5,750	2,900	8,650
Provincial Total		10	205	215	1405	6710	8115	7025	33550	40575

Expansion of distribution line and installation of additional public faucets are usually undertaken without appropriate technical study on the capacities of water sources and distribution facilities, resulting to decrease of supply pressure and quantity.

It is also common that water quality examination is not adequately conducted.

To attain technical sustainability of existing facilities, an appropriate technical guidance and skills training for operating bodies shall be arranged by concerned agencies/LGUs.

4.1.5 Level I Facilities

Level I facilities (point source) are common in rural barangays, mostly privately owned. Major facilities are different types of wells equipped with hand-pumps or developed spring with transmission line and one communal faucet. Rain collector is also used in some areas.

Level I facilities are classified in terms of safe and unsafe sources referring to the definition of DOH and the data from PHO as presented in Table 4.1.5 (details are referred to in Supporting Report). Served population in 1998 is also estimated as shown in the same table.

Of the 16,456 operational Level I facilities, 96% are shallow wells. According to the study on safe/unsafe percentage for shallow well, 30% of the shallow wells are estimated to be unsafe as the provincial average (detailed are referred to in Supporting Report 4.1.5). All deep wells, covered/improved dug wells and developed springs are regarded as safe water sources.

Table 4.1.5 Information on Existing Level I Facilities

Name of Municipality	Number of Safe Water Sources					Number of Unsafe Water Sources					Served by Safe Source					
											Number of Household			Number of Population		
	Deep Well	Shallow Well	Covered/ Improved Dug Well	Developed Spring	Total	Shallow Well	Open Dug Well	Undeveloped Spring	Rain Water Collector	Total	Urban	Rural	Total	Urban	Rural	Total
Anini-y	2	388		2	392	183	20			203	88	1,954	2,042	499	10,830	11,329
Barbaza	14	226		4	244	106				106	204	1,591	1,794	1,087	8,186	9,273
Belison	10	668			678	315				315	775	977	1,752	4,103	4,891	8,995
Bugasong		345		4	349	163				163	194	1,611	1,805	991	8,193	9,184
Caluya	81	16			97	8	26			34	963	1,480	2,443	5,107	7,861	12,968
Culasi	10	742		1	753	349	3			352		2,767	2,767		13,903	13,903
Hamtic	21	630		12	663	296	1			297		3,444	3,444		17,937	17,937
Laua-an	195	1,616		1	1,812	760	6			766	597	1,870	2,467	3,009	9,038	12,047
Libertad		377		7	384	177				177	321	1,108	1,429	1,693	6,107	7,800
Pandan		563		1	564	265	11			276	442	2,772	3,214	2,148	13,808	15,956
Patnongon	15	430		5	450	202				202	341	2,448	2,789	1,718	12,069	13,788
San Jose de Buenavista (Cap	8	853		1	862	402	8			410	4,486	717	5,203	23,145	3,513	26,658
San Remigio	157			5	162						205	2,956	3,162	989	15,747	16,736
Sebaste		702		1	703	331				331	1,043	288	1,331	5,231	1,472	6,703
Sibalom	1	1,497		7	1,505	705	2			707	1,113	4,478	5,592	5,886	23,183	29,069
Tibiao	31	1,144		2	1,177	538				538	549	1,436	1,984	2,561	7,025	9,586
Tobias Fornier	15	339		5	359	160	35			195		1,923	1,923		9,651	9,651
Valderrama	3	152		2	157	71	2			73	436	1,427	1,863	2,178	7,214	9,392
Provincial Total	563	10,689		60	11,312	5,030	114			5,144	11,756	35,246	47,001	60,346	180,629	240,975

In application of the unsafe percentage to shallow wells for each municipality, 11,313 Level I facilities are classified as safe sources, while 5,143 facilities are under unsafe sources.

Percentage shares between public and private Level I facilities for rural water supply is 17% and 83%, respectively. The share of developed springs in public facilities is 3% (details are referred to Supporting Report).

Problem areas observed on Level I facilities and necessary countermeasures for the improvement are summarized in terms of potable condition and functioning.

Most of the beneficiaries are not aware of the manner for O&M of the facilities. A considerable number of public wells are abandoned/non-functional due to lack of O&M, dried-up of wells and other reasons. In most cases, operating bodies for the facilities are not organized or non-functioning. Order-less private tapping to transmission line (spring water source) are also found at some Level I facilities, which caused insufficient water supply/water pressure.

Beneficiaries still rely on LGUs even for a simple replacement of parts (such as gasket). As for existing public Level-I, barangay council takes care of O&M using IRA allotted to barangay. In cases that major repair is required (replacement of hand pump unit/major parts), the barangay council submits barangay resolution of request for repairing to the municipal/provincial government. The municipal/provincial government assists them in case financial sources are secured. Beneficiaries contribute free labor.

Considering the current situation of beneficiaries, LGUs shall lead them to recognize the need of formation of association and participation for sound O&M of the facilities. Information dissemination to beneficiaries is a requisite.

(1) Unsafe water sources

Most of the cases declared as unsafe sources are driven shallow wells which are unprotected against seepage of surface water and usually located in nearby potential pollution sources, such as septic tank and piggery. (The Code on Sanitation requires a minimum distance of 25m between water source and pollution sources.)

These shallow wells shall be provided with concrete apron on the ground surface and proper drainage facility at the surrounding area. Relocation of wells or pollution sources may be another countermeasure. For new construction of shallow wells, proper site selection and appropriate construction method shall be applied together with periodic monitoring of water quality.

(2) Non-functioning/abandoned wells

There are a lot of non-functioning public wells in the province as shown in Table 4.1.6.

For Level I facilities, the BWSAs or beneficiaries have responsibility on O&M, however, it is almost negligible. This can be gleaned from the presence of numerous non-functioning/abandoned wells constructed by DPWH. These conditions arise from lack of spare parts, drying up of water source and water quality problems such as colored water.

Table 4.1.6 Operating Status of Existing Wells in the Province

Operating Status	Unit	Public Facility		Private Facility		Total
		Deep Well	Shallow Well	Deep Well	Shallow Well	
Functioning	No.	323	2,567	240	13,152	16,282
	Percent	42	91	100	100	96
Non-Functioning	No.	442	261		7	710
	Percent	58	9			4
Total Number		765	2,828	240	13,159	16,992

Note: Number of non-functioning wells includes abandoned wells, but details in number and reasons are not available.

Among others, deep wells usually necessitate repair/replacement of mechanical parts and redevelopment of the well itself. Apart from the same problems as deep wells, shallow wells have primary disadvantages such as the use of shallow aquifer which is easily affected by surrounding environmental conditions and the simple construction method applied (driving well point) that makes rehabilitation works difficult.

To prolong the service life of public deep wells, periodic check-up entailing preventive maintenance and redevelopment of wells are to be performed. Meanwhile, proper site selection and protection of well sources are requisites for shallow wells.

4.1.6 Water Supply Service Coverage

According to the definition of DOH in terms of safe and unsafe sources, service coverage was studied under "served", "underserved" and "unserved" categories.

The present population of the municipalities as of 1998, base year for planning purpose, was estimated referring to NSO population census results (1980, 1990 and 1995) and 1995 Census-based Regional and Provincial Population projection prepared by NSO. Details are referred to Section 8.3.1 Population Projection.

Water supply service coverage by service level is estimated for urban and rural areas covering all municipalities under the following conditions and assumptions:

- Service percentage/population by Level III and Level II systems was estimated based on the questionnaire survey results.
- Unserved population was estimated using the percentages of unserved households to the total number of households by urban and rural area based on questionnaire and the 1990 population census data; "Households by Main Source of Drinking Water and City/Municipality", with modification of maximum 20% referring to the previous results.
- The rest of the population was considered served by Level I facilities assuming that 50% of private facilities was shared by neighbors to supplement insufficiency of public facilities.

Average number of households sharing at each Level I public/private facility was calculated at an average of 6 households/facility under the above assumptions (details are referred to in Supporting Report).

Table 4.1.7 presents the profile of the service coverage in terms of served, underserved and unserved. As a provincial total, 71% of the population is adequately served (80% of urban population and 68% of rural population).

The percentage of underserved population is estimated at 14% of the total population (12% of urban population and 14% of rural population) who are depending on unsafe sources/facilities.

The provincial service coverage at present is exhibited in Figure 4.1.1 (details are referred to Supporting Report).

Among different service levels, Level I water supply facilities have predominant service coverage in most of the municipalities in the province.

Percentage shares of population coverage by Level I public and private facilities in rural water supply are estimated at 60% and 40%, respectively (details are referred to in Supporting Report).

Level III systems take a major part of service coverage in urban water supply in limited municipalities/city, such as Bugasong (69%), Culasi (82%), Pandan (92%), Sibalom (55%) and Tobias Fornier (84%).

With regard to Level II system in rural areas, 3 to 21% of service coverage were observed in some municipalities. Presently, piped system including Level III systems have not been fully developed in the entire province (7% for Level II and 16% for Level III systems).

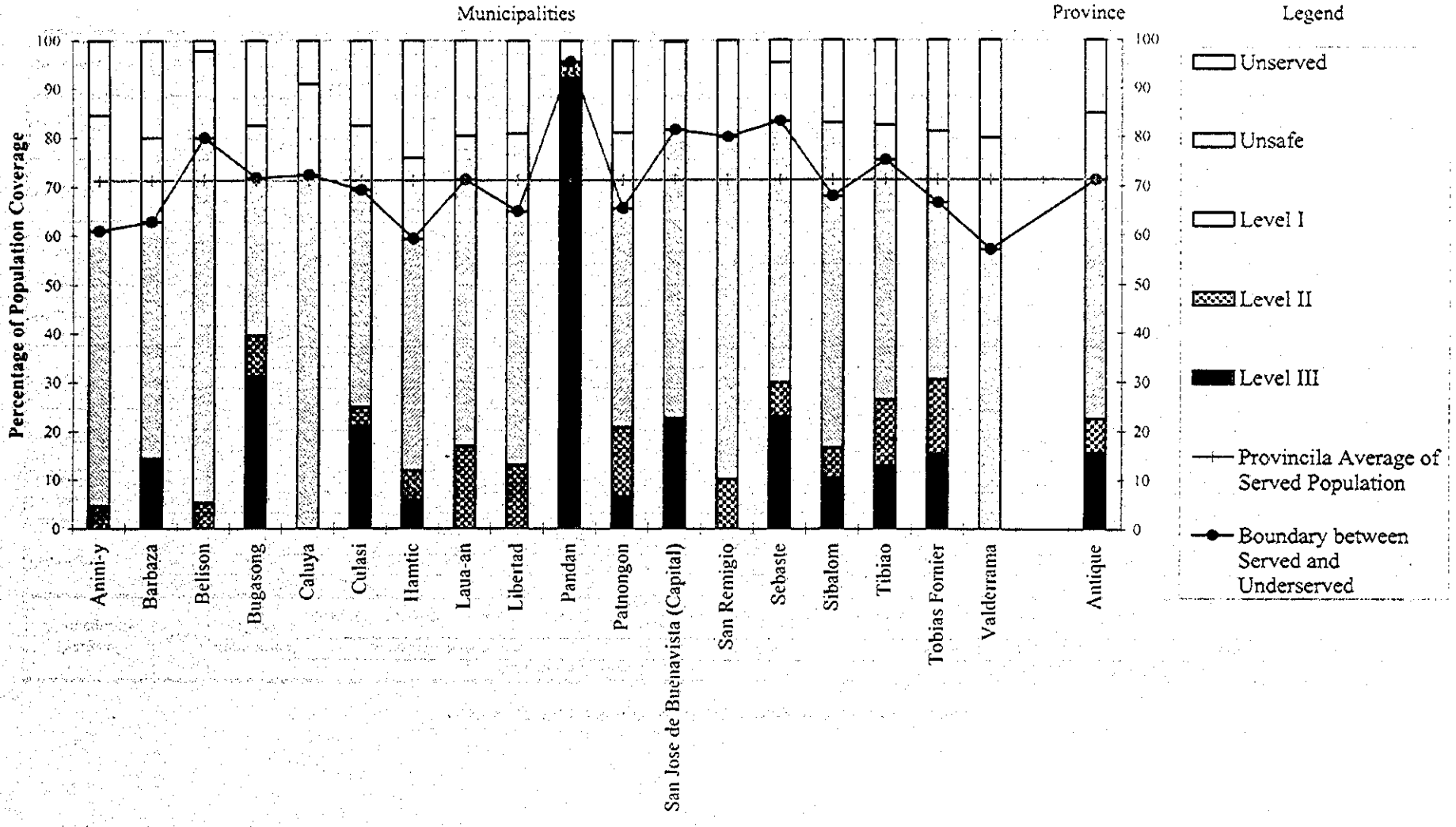
Table 4.1.7 Water Supply Service Coverage by Municipality

Name of Municipality	Area	Population (1998)	Population Coverage							Percentage of Population Coverage						
			Served by Safe Source				Underseved/Unserved			Served by Safe Source				Underseved/Unserved		
			Level III	Level II	Level I	Total	Unsafe Source	Unserved	Total	Level III	Level II	Level I	Total	Unsafe Source	Unserved	Total
Anini-y	Urban	765			499	499	113	153	266			65	65	15	20	35
	Rural	19,376		950	10,830	11,780	4,646	2,950	7,596		5	56	61	24	15	39
	Total	20,141		950	11,329	12,279	4,759	3,103	7,862		5	56	61	24	15	39
Barbaza	Urban	2,924	770		1,087	1,857	476	591	1,067	26		37	64	16	20	36
	Rural	16,251	2,002		8,186	10,188	2,814	3,249	6,063	12		50	63	17	20	37
	Total	19,175	2,772		9,273	12,045	3,290	3,840	7,130	14		48	63	17	20	37
Belison	Urban	4,809			4,103	4,103	677	29	706			85	85	14	1	15
	Rural	7,252		650	4,891	5,541	1,478	232	1,711		9	67	76	20	3	24
	Total	12,061		650	8,995	9,645	2,155	261	2,416		5	75	80	18	2	20
Bugasong	Urban	7,034	4,866		991	5,857	466	711	1,177	69		14	83	7	10	17
	Rural	21,527	4,078	2,375	8,193	14,646	2,575	4,305	6,881	19	11	38	68	12	20	32
	Total	28,561	8,944	2,375	9,184	20,503	3,042	5,016	8,058	31	8	32	72	11	18	28
Caluya	Urban	5,540			5,107	5,107	266	167	433			92	92	5	3	8
	Rural	12,372			7,861	7,861	3,075	1,435	4,511			64	64	25	12	36
	Total	17,912			12,968	12,968	3,342	1,602	4,944			72	72	19	9	28
Culasi	Urban	5,444	4,455			4,455		989	989	82			82		18	18
	Rural	25,903	2,174	1,200	13,903	17,277	4,107	4,519	8,626	8	5	54	67	16	17	33
	Total	31,347	6,629	1,200	13,903	21,732	4,107	5,508	9,615	21	4	44	69	13	18	31
Hamtic	Urban	4,181	1,575	200		1,775		2,406	2,406	38	5		42		58	58
	Rural	33,674	617	2,125	17,937	20,679	6,263	6,733	12,995	2	6	53	61	19	20	39
	Total	37,855	2,192	2,325	17,937	22,454	6,263	9,139	15,401	6	6	47	59	17	24	41
Laua-an	Urban	3,775			3,009	3,009	88	679	766			80	80	2	18	20
	Rural	18,391		3,775	9,038	12,813	1,902	3,676	5,578		21	49	70	10	20	30
	Total	22,166		3,775	12,047	15,822	1,989	4,355	6,344		17	54	71	9	20	29
Libertad	Urban	2,218			1,693	1,693	196	329	525			76	76	9	15	24
	Rural	12,831		1,975	6,107	8,082	2,182	2,567	4,749		15	48	63	17	20	37
	Total	15,049		1,975	7,800	9,775	2,378	2,896	5,274		13	52	65	16	19	35
Pandan	Urban	3,126	2,883			2,883		243	243	92			92		8	8
	Rural	22,925	21,160	875		22,035		890	890	92	4		96		4	4
	Total	26,051	24,043	875		24,918		1,133	1,133	92	3		96		4	4

Table 4.1.7 Water Supply Service Coverage by Municipality (cont'd)

Name of Municipality	Area	Population (1998)	Population Coverage							Percentage of Population Coverage						
			Served by Safe Source				Underseved/Unserved			Served by Safe Source				Underseved/Unserved		
			Level III	Level II	Level I	Total	Unsafe Source	Unserved	Total	Level III	Level II	Level I	Total	Unsafe Source	Unserved	Total
Patnongon	Urban	4,739	1,835		1,718	3,553	551	634	1,186	39		36	75	12	13	25
	Rural	26,145	165	4,450	12,069	16,684	4,232	5,229	9,461	1	17	46	64	16	20	36
	Total	30,884	2,000	4,450	13,788	20,238	4,783	5,863	10,646	6	14	45	66	15	19	34
San Jose de Buenavista (Capital)	Urban	41,483	9,960	150	23,145	33,255	8,206	22	8,228	24	0	56	80	20	0	20
	Rural	3,818		150	3,513	3,663		155	155		4	92	96		4	4
	Total	45,301	9,960	300	26,658	36,918	8,206	177	8,383	22	1	59	81	18	0	19
San Remigio	Urban	1,236			989	989		247	247			80	80		20	20
	Rural	22,744		2,450	15,747	18,197		4,547	4,547		11	69	80		20	20
	Total	23,980		2,450	16,736	19,186		4,794	4,794		10	70	80		20	20
Sebaste	Urban	10,311	2,885	800	5,231	8,916	1,268	127	1,395	28	8	51	86	12	1	14
	Rural	2,251		75	1,472	1,547	255	449	704		3	65	69	11	20	31
	Total	12,562	2,885	875	6,703	10,463	1,523	576	2,099	23	7	53	83	12	5	17
Sibalom	Urban	8,354	4,614	75	2,375	7,064	401	889	1,290	55	1	28	85	5	11	15
	Rural	40,776	486	3,000	22,852	26,338	6,970	7,468	14,438	1	7	56	65	17	18	35
	Total	49,130	5,100	3,075	25,226	33,401	7,371	8,358	15,729	10	6	51	68	15	17	32
Tibiao	Urban	4,584	1,228		2,561	3,789	361	434	795	27		56	83	8	9	17
	Rural	15,044	1,318	2,650	7,025	10,993	1,043	3,009	4,051	9	18	47	73	7	20	27
	Total	19,628	2,546	2,650	9,586	14,782	1,403	3,443	4,846	13	14	49	75	7	18	25
Tobias Fornier	Urban	4,407	3,683	150		3,833		574	574	84	3		87		13	13
	Rural	22,364	394	3,950	9,651	13,995	3,894	4,475	8,369	2	18	43	63	17	20	37
	Total	26,771	4,077	4,100	9,651	17,828	3,894	5,049	8,943	15	15	36	67	15	19	33
Valderrama	Urban	3,561			2,178	2,178	641	742	1,383			61	61	18	21	39
	Rural	12,917			7,214	7,214	3,117	2,586	5,703			56	56	24	20	44
	Total	16,478			9,392	9,392	3,758	3,328	7,086			57	57	23	20	43
Provincial Total	Urban	118,491	38,754	1,375	54,686	94,815	13,711	9,965	23,676	33	1	46	80	12	8	20
	Rural	336,561	32,394	30,650	166,490	229,534	48,552	58,475	107,027	10	9	49	68	14	17	32
	Total	455,052	71,148	32,025	221,176	324,349	62,263	68,440	130,703	16	7	49	71	14	15	29

Figure 4.1.1 Water Supply Coverage of the Province



Taking into account the municipal service coverage, of the 18 municipalities/city of the province, 9 are above the average provincial service coverage of 69% in terms of served population. The highest coverage is seen in Pandan at 96% (92% for urban and 96% for rural area), followed by Sebaste at 83% (86% for urban and 69% for rural area), San Jose at 81% (80% for urban and 96% for rural area), Belison at 80% (85% for urban and 76% for rural area) and San Remigio at 80% (80% both for urban and rural area).

In contrast to the above, 9 municipalities are below the provincial average. The lowest is Valderrama at 57%, followed by Hamtic at 59%. The low coverage of these municipalities is considered to arise from existence of a large number of unreported Level I facilities.

4.2 Sanitation and Sewerage

4.2.1 General

The national strategy for sanitation and sewerage is demand-oriented. It aims to stimulate sustainable improvements in sanitation service coverage, public health, and environmental pollution abatement. To achieve this goal, the Government has made investment choices based on demand and the extent to which choices contribute to efficiency and cost-effectiveness.

This sub-sector focuses on household toilets, school toilets and public toilets (public markets, bus/jeepney terminals and parks/playgrounds). The latest data from the PHO on household and public toilets as well as from DECS on school toilets were gathered by municipality. For household toilets, data were compiled by urban and rural area. These facilities were classified into sanitary and unsanitary in terms of structure rather than the surrounding conditions.

The Code on Sanitation of the Philippines provides the minimum standards for services dealing with public health. Specifically, Chapter XVII on Sewage Collection and Disposal, Excreta Disposal and Drainage (Implementing Rules and Regulations, 1995) defines alternatives for on-site sanitation and sewage collection and disposal. At present, the development of sewerage systems, even in the urban centers of the province is not given priority because of the huge investment cost it entails.

In the NEDA Board Resolution No. 12 (series of 1995), definitions of approved types of sanitary toilets were outlined (refer to 4.1.2, Data Report). There were 4 approved types of sanitary toilets including the sanitary pit privy where water is not used but provided with

cover to minimize the emission of foul odor and also to keep away flies and rodents. These definitions were applied in this Master Plan.

4.2.2 Types of Facilities and Definition of Service Level Standard

As set forth in the above-mentioned Resolution, the types of household toilet facilities commonly used are categorized into: 1) sanitary toilets - approved types of toilet facilities include water-sealed pour flush or flush-type toilets either with receiving pit or septic tanks/vaults, and ventilated improved pit latrines and sanitary pit privy (dry type) considering its low construction cost especially in rural areas and in areas where water is scarce; and 2) unsanitary facilities - include the types of facilities used for receiving and disposing human waste which do not fall under the category of approved types of toilet facilities such as open pit privy and over-hung latrines (refer to Figure 4.2.1 DOH standard structure of a household toilet that meets the minimum requirements of a sanitary facility, Supporting Report).

In terms of service level, households are classified into: 1) served households - households with at least one (1) sanitary toilet; 2) underserved households - households with unsanitary toilets; and 3) unserved households - households without toilet. Coverage of adequately served households (with sanitary toilets) was estimated by urban and rural area of municipalities. The remaining households were considered as underserved or unserved. The service coverage was determined using the estimated number of households in 1998.

Service level standard for both elementary and secondary school toilets is translated in terms of: 1) served students - students who are adequately covered by the DECS standard ratio of one (1) unit per 40 students with access to sanitary toilets (number of sanitary toilet units multiplied by 40); and (2) underserved or unserved students - those with unsanitary and without toilet facilities, and students unserved (based on the standard ratio) even though they have access to sanitary toilets. Service coverage of adequately served students was estimated both for public and private schools by municipality. Figure 4.2.2, Supporting Report shows a standard structure of a school toilet facility adopted by the DOH through the JICA-DPWH and DOH Rural Environmental Sanitation Project.

For public toilets, the service level is classified into: 1) served - utilities that have at least one (1) sanitary toilet, and 2) underserved or unserved - utilities that have unsanitary or without toilet facilities. Service coverage of public utilities was estimated as a percentage of sanitary facilities to the total number of utilities. Figure 4.2.3, Supporting Report shows a standard structure of a public toilet facility adopted by the DOH.

4.2.3 Sanitation Facilities and Service Coverage

(1) Household Toilets

The service coverage of sanitary toilets in the province is 73% of the total number of households. The rest is underserved or unserved. Of this, a high 68% is without toilet facility (refer to 4.2.1, Supporting Report and 4.2.3, Sanitation Facilities and Service Coverage, Data Report).

Municipalities that have higher or equal service coverage from the provincial average of 73% are Belison (86%), Tobias Fornier (84%), San Jose de Buenavista and Sebaste (83%), Sibalom (82%), Patnongon (81%), Pandan (80%) and Anini-y (74%). On the other hand, the first 5 municipalities that registered the lowest service coverage are Culasi and San Remigio (55%), Bugasong (58%), Caluya (62%) and Valderrama (68%). It was observed that in municipalities/city that have high water supply service coverage (Sebaste, Belison, San Jose de Buenavista), high sanitation coverage occurs and correspondingly, in low water supply service coverage (Valderrama, Barbaza), low sanitation coverage occurs. This can be attributed by the fact that the development of water supply almost always follows the upgrading of the household sanitation facilities because of access to water.

In urban areas, about 80% of the total households are served. A lower served household of 71% exists in rural area. Table 4.2.1 shows the municipal breakdown in the number of urban and rural household toilets by category, and service coverage. Figure 4.2.1 reflects the provincial service coverage of household toilet facilities for urban and rural areas.

Even if high percentages of sanitary toilets are revealed in urban areas, problems arise from the unsatisfactory disposal of the effluent from the septic tanks or the direct discharge of wastewater to the local drains. Generally, there is little concern about the unsatisfactory disposal of wastes once it is outside their dwelling units. Practically, almost all the households dispose their wastes in the manner that poses risks to public health. Sullage waste management is unheard of.

(2) School and Public Toilets

Toilet facilities in elementary and secondary schools for both public and private schools were investigated. The province has a total of 1,817 toilet units found in 497 schools. Sanitary toilets adequately serve 54% of the students. The rest, 46% is underserved or unserved. Meanwhile, sanitary toilets adequately serve 54% of the public school students.

Table 4.2.1 Sanitation Facilities and Service Coverage of Household Toilets, Urban and Rural, 1998

Municipality	No. of Households, 1998			Household Toilet Facilities and Service Coverage											
				Urban				Rural				Municipal Total			
	Urban	Rural	Total	HHs Served by Sanitary Toilets		Underserved/ Unserved HHs		HHs Served by Sanitary Toilets		Underserved/ Unserved HHs		HHs Served by Sanitary Toilets		Underserved/ Unserved HHs	
				Number	% of HHs	Number	% of HHs	Number	% of HHs	Number	% of HHs	Number	% of HHs	Number	% of HHs
Alburq.	135	3,496	3,630	112	83	23	17	2,582	74	914	26	2,694	74	937	26
Barbaza	548	3,158	3,706	482	88	66	12	2,112	67	1,046	33	2,594	70	1,112	30
Belison	908	1,448	2,356	802	88	106	12	1,230	85	218	15	2,032	86	324	14
Bugasong	1,375	4,233	5,607	910	66	465	34	2,328	55	1,905	45	3,238	58	2,370	42
Caluya	1,044	2,329	3,374	725	69	319	31	1,355	58	974	42	2,080	62	1,293	38
Culasi	1,076	5,155	6,231	872	81	204	19	2,577	50	2,578	50	3,449	55	2,782	45
Hamtic	822	6,465	7,287	682	83	140	17	4,457	69	2,008	31	5,139	71	2,148	29
Laua-an	749	3,805	4,554	376	50	373	50	2,816	74	989	26	3,192	70	1,362	30
Libertad	421	2,329	2,749	345	82	76	18	1,601	69	728	31	1,946	71	804	29
Pandan	644	4,601	5,245	508	79	136	21	3,676	80	925	20	4,184	80	1,061	20
Patnongon	939	5,303	6,242	817	87	122	13	4,226	80	1,077	20	5,043	81	1,199	19
San Jose de BuBuenavista	8,040	779	8,819	6,605	82	1,435	18	723	93	56	7	7,328	83	1,491	17
San Remigio	257	4,270	4,527	165	64	92	36	2,334	55	1,936	45	2,499	55	2,028	45
Sebaste	2,055	440	2,496	1,745	85	310	15	332	75	108	25	2,077	83	418	17
Sibalom	1,580	7,877	9,457	1,397	88	183	12	6,382	81	1,495	19	7,779	82	1,678	18
Tibiao	982	3,075	4,057	790	80	192	20	2,122	69	953	31	2,912	72	1,145	28
Tobias Fornier	825	4,456	5,281	508	62	317	38	3,954	89	502	11	4,462	84	819	16
Valderrama	712	2,555	3,267	539	76	173	24	1,691	66	864	34	2,230	68	1,037	32
Provincial Total	23,112	65,774	88,886	18,380	80	4,732	20	46,498	71	19,276	29	64,878	73	24,008	27

Figure 4.2.1 Provincial Service Coverage of Hou sehold Toilet Facilities, 1998

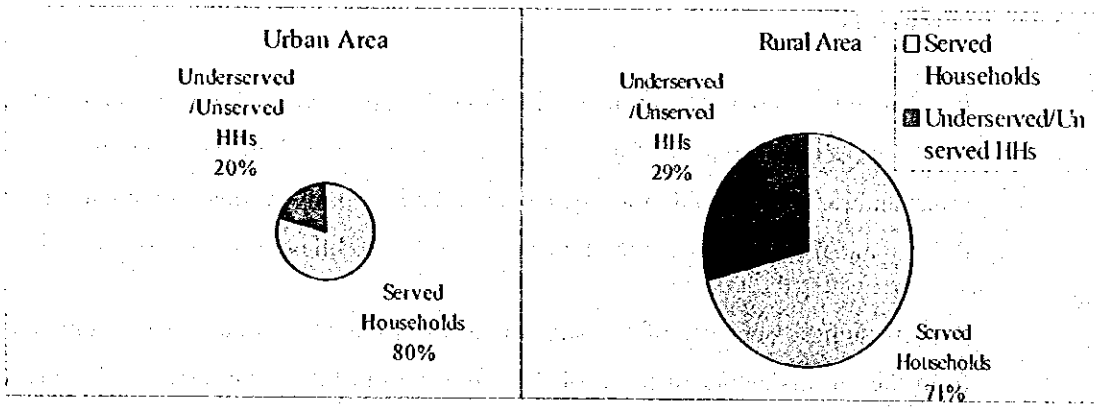


Table 4.2.2 provides the number and service coverage of school toilet facilities.

The number of sanitary school toilets is low to meet the service level standard of 40 students per sanitary facility. At present, the average ratio is about 70 students per sanitary toilet, which is almost double the standard level. A number of school toilets are not being used due to lack of water supply, destroyed plumbing fixtures and water tank seepage. Proper operation and maintenance are not usually done. In some areas, this problem is compounded when access to the sanitary facility is limited to only the teachers and guests.

Table 4.2.2 School Toilet Service Coverage by Municipality

Municipality		Number of School	Total No. of Student	Number of Toilet		Service Coverage			
				Sanitary	Unsanitary	Served	%	Unserved	%
Anini-y	Public	20	3,892	104	5	3,892	100		
	Private	2	875	14		560	64	315	36
	Total	22	4,767	118	5	4,452	93	315	7
Barbaza	Public	17	4,095	36	2	1,440	35	2,655	65
	Private	1	472	13		472	100		
	Total	18	4,567	49	2	1,912	42	2,655	58
Belison	Public	9	2,294	60		2,294	100		
	Private								
	Total	9	2,294	60		2,294	100		
Bugasong	Public	23	5,602	98	4	3,920	70	1,682	30
	Private	2	437	6		240	55	197	45
	Total	25	6,039	104	4	4,160	69	1,879	31
Caluya	Public	17	4,809	36		1,440	30	3,369	70
	Private	1	273	4		160	59	113	41
	Total	18	5,082	40		1,600	31	3,482	69
Culasi	Public	33	6,888	80	12	3,200	46	3,688	54
	Private	1	519	6		240	46	279	54
	Total	34	7,407	86	12	3,440	46	3,967	54
Hamtic	Public	37	9,232	120	7	4,800	52	4,432	48
	Private								
	Total	37	9,232	120	7	4,800	52	4,432	48
Laua-an	Public	27	4,933	54		2,160	44	2,773	56
	Private								
	Total	27	4,933	54		2,160	44	2,773	56
Libertad	Public	15	3,071	30		1,200	39	1,871	61
	Private	1	192	4		160	83	32	17
	Total	16	3,263	34		1,360	42	1,903	58
Pandan	Public	36	6,936	68	10	2,720	39	4,216	61
	Private	1	612	7		280	46	332	54
	Total	37	7,548	75	10	3,000	40	4,548	60
Patnongon	Public	41	15,266	98	30	3,920	26	11,346	74
	Private	1	403	5		200	50	203	50
	Total	42	15,669	103	30	4,120	26	11,549	74
San Jose de Buenavista	Public	24	7,415	166	2	6,640	90	775	10
	Private	1	386	5		200	52	186	48
	Total	25	7,801	171	2	6,840	88	961	12
San Remigio	Public	40	6,222	54	56	2,160	35	4,062	65
	Private	1	174	6		174	100		
	Total	41	6,396	60	56	2,334	36	4,062	64
Sebaste	Public	11	2,737	72	4	2,737	100		
	Private	1	431	7		280	65	151	35
	Total	12	3,168	79	4	3,017	95	151	5
Sibalom	Public	52	11,883	212	11	8,480	71	3,403	29
	Private	1	139	5		139	100		
	Total	53	12,022	217	11	8,619	72	3,403	28
Tibiao	Public	17	4,581	50	5	2,000	44	2,581	56
	Private	1	284	5		200	70	84	30
	Total	18	4,865	55	5	2,200	45	2,665	55
Tobias Fornier	Public	39	5,338	204	7	5,338	100		
	Private	1	281	4		160	57	121	43
	Total	40	5,619	208	7	5,498	98	121	2
Valderrama	Public	22	3,876	14	11	560	14	3,316	86
	Private	1	235	4		160	68	75	32
	Total	23	4,111	18	11	720	18	3,391	82
Provincial Total	Public	480	109,070	1,556	166	58,901	54	50,169	46
	Private	17	5,713	95		3,625	63	2,088	37
	Total	497	114,783	1,651	166	62,526	54	52,257	46

DECS is currently promoting the practice of having one toilet within the classroom. This practice should be thoroughly reviewed with respect to maintaining sanitary condition, provision of water faucet/supply in every toilet/unit, proper design of depository to avoid groundwater pollution, and provision of regular sludge collection and disposal.

There are 48 public toilets found in public markets, bus/jeepney terminals and parks/playgrounds in the province. About 71% of these public toilets is sanitary, while only 29% is considered unsanitary. Table 4.2.3 shows the number and service coverage of public utilities.

Public toilets at markets, bus/jeepney terminals and parks/playgrounds, although culturally acceptable, are improperly used and maintained resulting to unsanitary conditions. In most cases, no specific arrangements are made for the operation and maintenance and for the collection of fees to cover such costs. Although considered as sanitary because of the structure, most of the facilities have unsanitary conditions due to inadequate/lack of water supply and destroyed appurtenances because of vandalism.

Table 4.2.3 Public Toilet Facilities and Service Coverage in 1998

Municipality	Number of Sanitary Toilet			Number of Unsanitary Toilet			Total Number of PU Toilet	Served		Underserved	
	Public Market	Bus/Jeepney Terminal	Parks/ Playground	Public Market	Bus/Jeepney Terminal	Park/ Play-ground		Number of Sanitary Toilet	%	Number of Unsanitary Toilet	%
Anini-y	6		4				10	10	100		
Barbaza				2			2			2	100
Belison				2			2			2	100
Bugasong	2						2	2	100		
Caluya											
Culasi	2						2	2	100		
Hamtic	2						2	2	100		
Laua-an	2						2	2	100		
Libertad			2	2			4	2	50	2	50
Pandan	2						2	2	100		
Patnongon	2						2	2	100		
San Jose de Buenavista	4				2		6	4	67	2	33
San Remigio				2			2			2	100
Sebaste				2			2			2	100
Sibalom	2						2	2	100		
Tibiao	2						2	2	100		
Tobias Fornier				2			2			2	100
Valderrama	2						2	2	100		
Provincial Total	28		6	12	2		48	34	71	14	29

4.2.4 Sewerage Facilities

There are no existing sewerage facilities in the province. Most of the wastewater from the dwelling units with acceptable facilities finds its way to open drains and eventually to watercourses. These deficiencies are the major contributing factors to the poor condition of the water environment in some areas of the province.